Rural Training Center – Thailand (RTC-TH)

F CUS

Community-based Environmental Education for the Self-sufficiency and Sustainability of Small Rural Family Farms

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Basic
MEWS Weather Observing
Lesson B5:
Estimating Cloud Base Height

2012 Ed

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A Mobile Emergency Weather Station (MEWS) Training Series presentation

Rural Training Center-Thailand
Emergency Communications Program

Ready to serve and sustain our community

For other lessons in the series e-mail hsØzhm@gmail.com
www.neighborhoodlink.com/org/rtcth

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A part of the RTC-TH EmComm Program

The Rural Training Center-Thailand Emergency Communications program is a volunteer effort to provide emergency amateur radio communications for local community self-sufficiency and sustainability in times of need.

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The Rural Training Center-Thailand (RTC-TH)

is an all volunteer organization providing community-based environmental education for self-sufficiency and sustainability of small rural family farms

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MEWS adapts weather lessons from two existing RTC-TH programs

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The Rural Training Center-Thailand was created to honor the life and memory of Mr. Tang Suttisan, a father, farmer and former custodian of Ban Na Fa Elementary School who appreciated and valued education.

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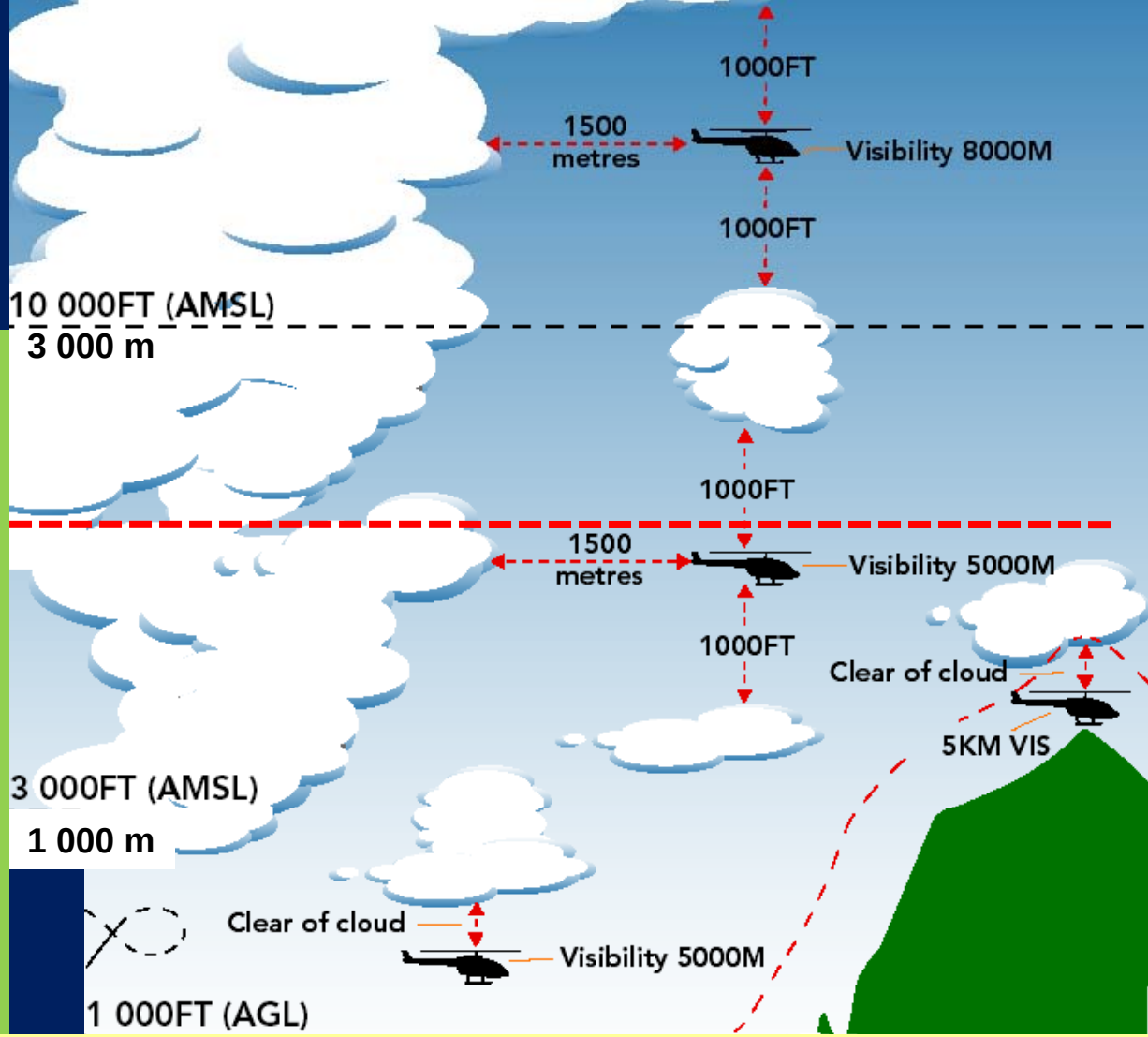
Clouds affect helicopter VFR (Visual Flight Rules) operations

The highest mountain in Nan Province is Doi Phu Kha (1980 m amsl)

Flights below 3000 m amsl do not require supplementary oxygen for flight crews



Minimum cloud base heights between 2500-3000 m would permit safe helicopter flight operations in Nan Province. Other flight conditions need to be considered (e.g. wind speed, temperature, etc.).

However, the pilot in command has final say for Go/No Go for all flights.

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The height of the cloud base sets the "ceiling" (the maximum altitude) for flying under VFR (visual flight rules).

VFRs for helicopters means the pilot must be able to see the ground at all times and cannot fly into or through clouds.

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MEWS Basic Weather Observers can gather critical flight weather data

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Amateur radio operators with portable weather equipment and MEWS training can provide this information when no weather stations are in the disaster area.

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MEWS can help avoid this

Weather can change fast. This helicopter crashed into a mountain in Nan Province when clouds limited visibility.

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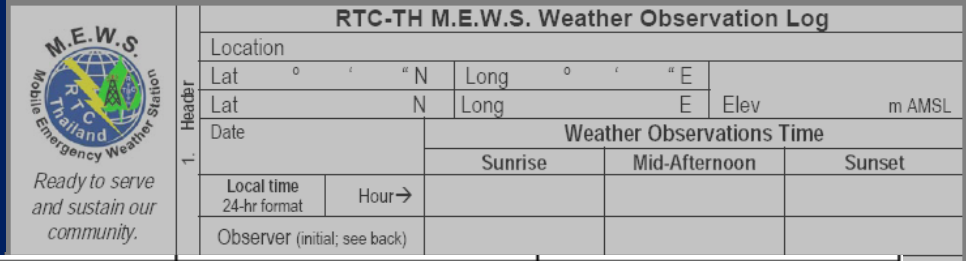
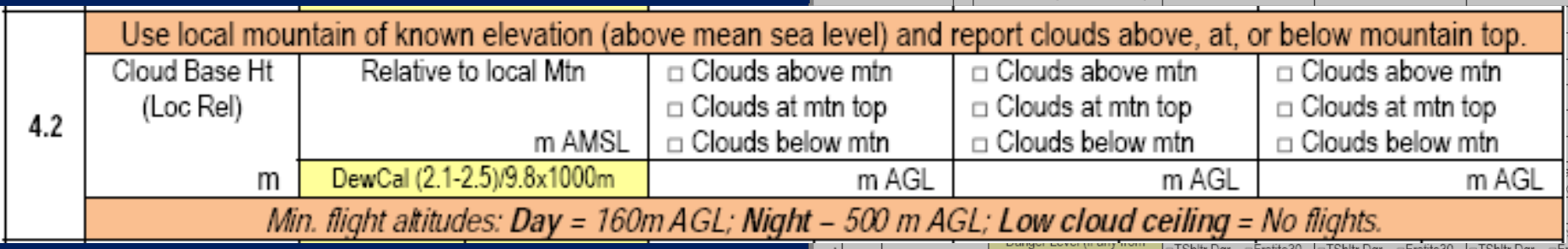
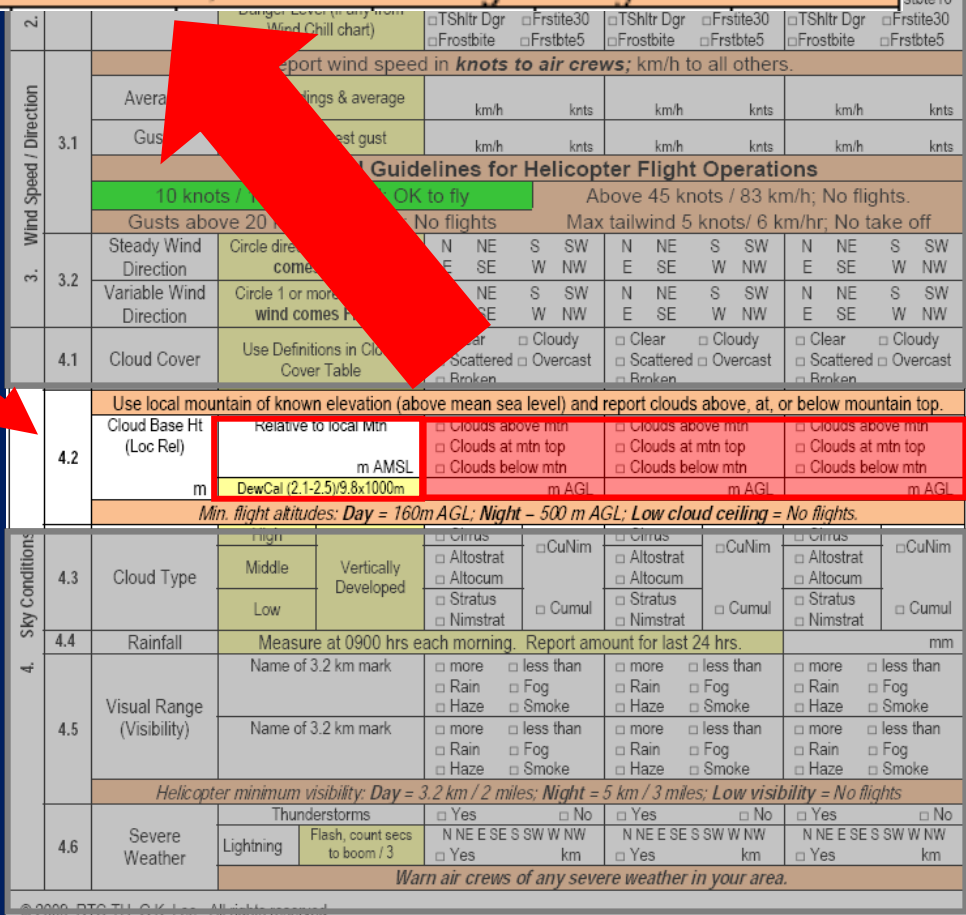
Cloud Base Height Estimate







Cloud Base Height Estimate is recorded on Line 4.2

The write the estimated cloud base height for the lowest type cloud formation

See Handbook: 4.2 Cloud Base Height (Ceiling), p. 23

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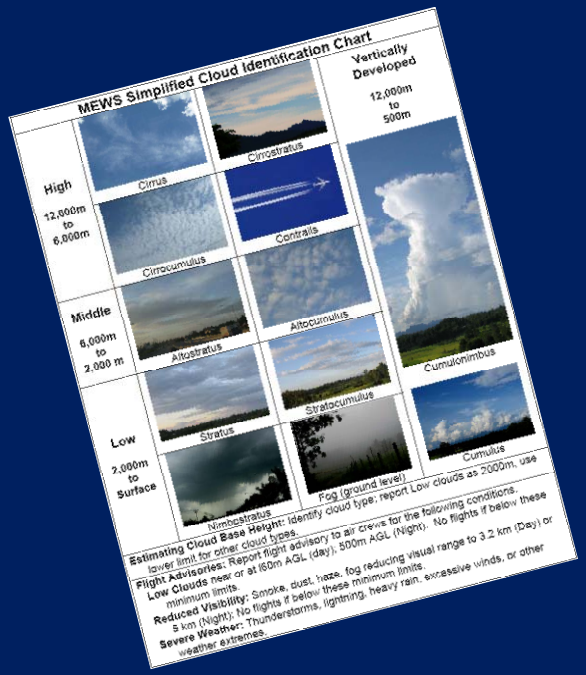
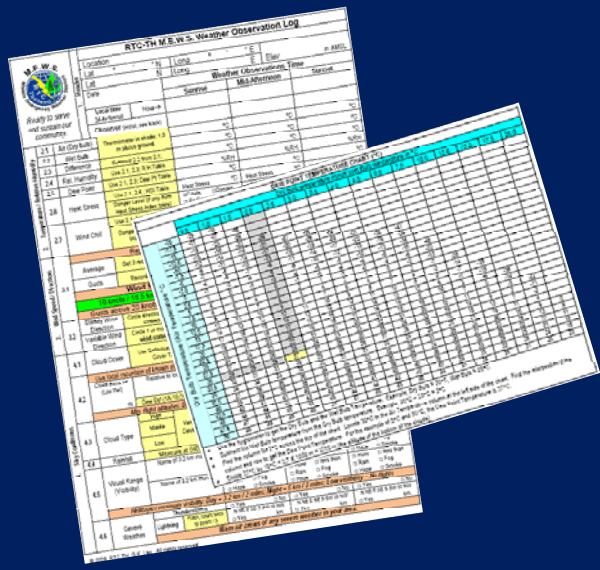
Three ways to estimate the cloud base height

Cloud types / altitude ranges from the cloud ID chart.



Cloud base height relative to a local mountain in sight of your location.

Dew Point Calculation Method



This is covered in Advanced MEWS Lesson A3

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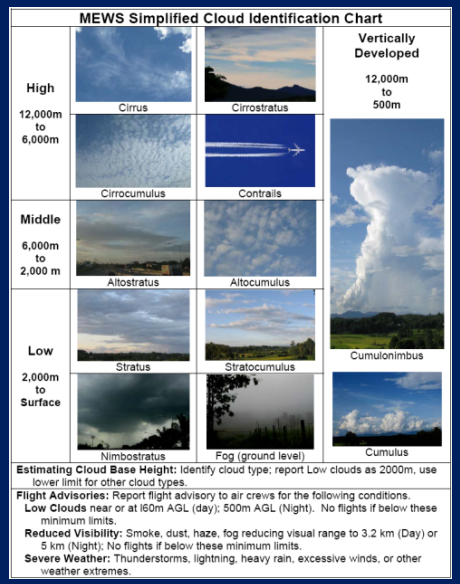
Decide on a Basic Estimation of Cloud Base Height Method

Any mountains nearby?

No → Use the Cloud ID Chart Method

Yes → Use the Clouds Relative to a Local Mountain Method



General: limited value

Better; but doesn't give a specific altitude.

The Dew Point Method is the best to use for this data item. You can learn the Dew Point Method in MEWS Advanced lesson A3.

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What if there are no nearby mountains in the area?

If you know the types of clouds in your area, you can get a very general estimate the cloud base height using the Cloud ID Chart.

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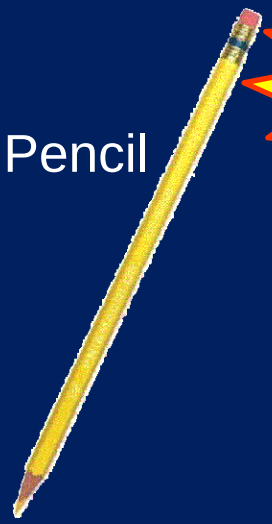
What you need to make estimate cloud base height by Cloud Type

Pencil



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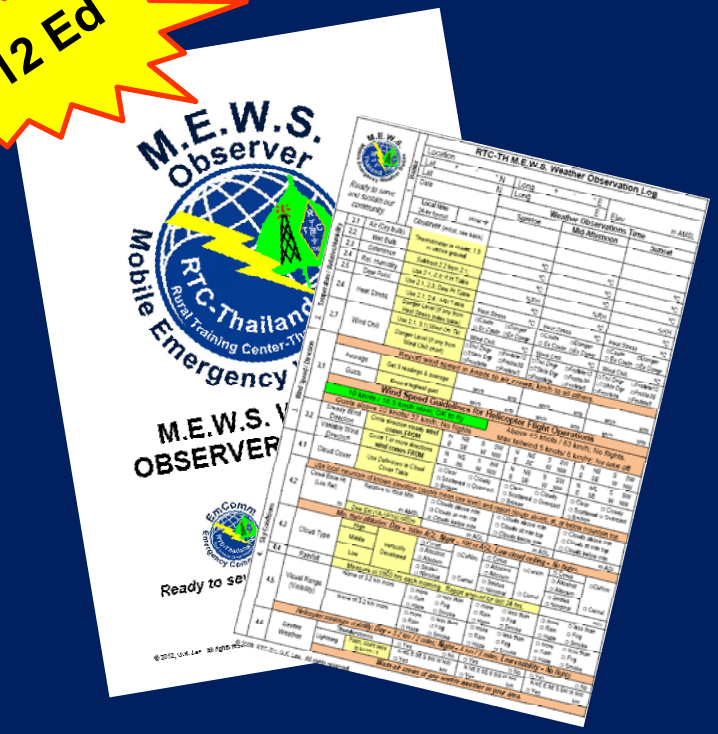
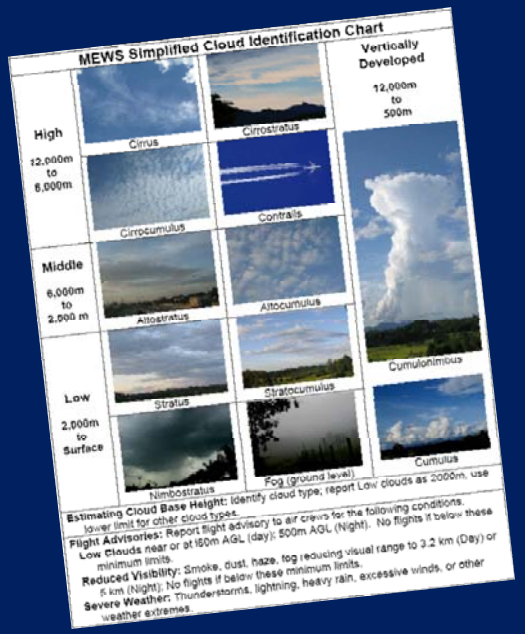


MEWS Handbook, Cloud Identification Chart, and Log Form



Cloud Identification Chart

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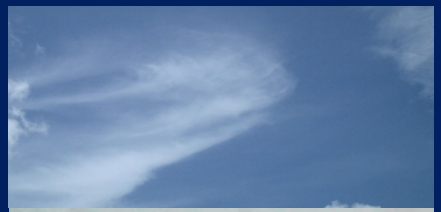
Look at the Shape of the Clouds

Look at the clouds. Use the shape names and the chart of Cloud Heights & Types.

- Cirroform (curly)



- Stratiform (flat)

- Cumuloform (lumpy)

- Fog (no shape)

See Basic MEWS Lesson B6 Identifying Cloud Types for more details

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Cloud Height Groups

Clouds are grouped by the relative altitude where they occur and their shape.

High 12,000m to 6,000m	Cirrus Cirrostratus Cirrocumulus Contrails	**Vertically Developed Clouds** 12,000m to 500m Cumulonimbus Cumulus
Middle 6,000m to 2,000m	Altostratus Altocumulus	
Low 2,000m to surface	Nimbostratus Stratocumulus Stratus Fog	

MEWS observers in Nan Province supporting flight operations should pay attention to these cloud groups.

In Nan Province, helicopters operating from 3,000m to 6,000m are safely above Doi Phu Kha (the tallest mountain in Nan).

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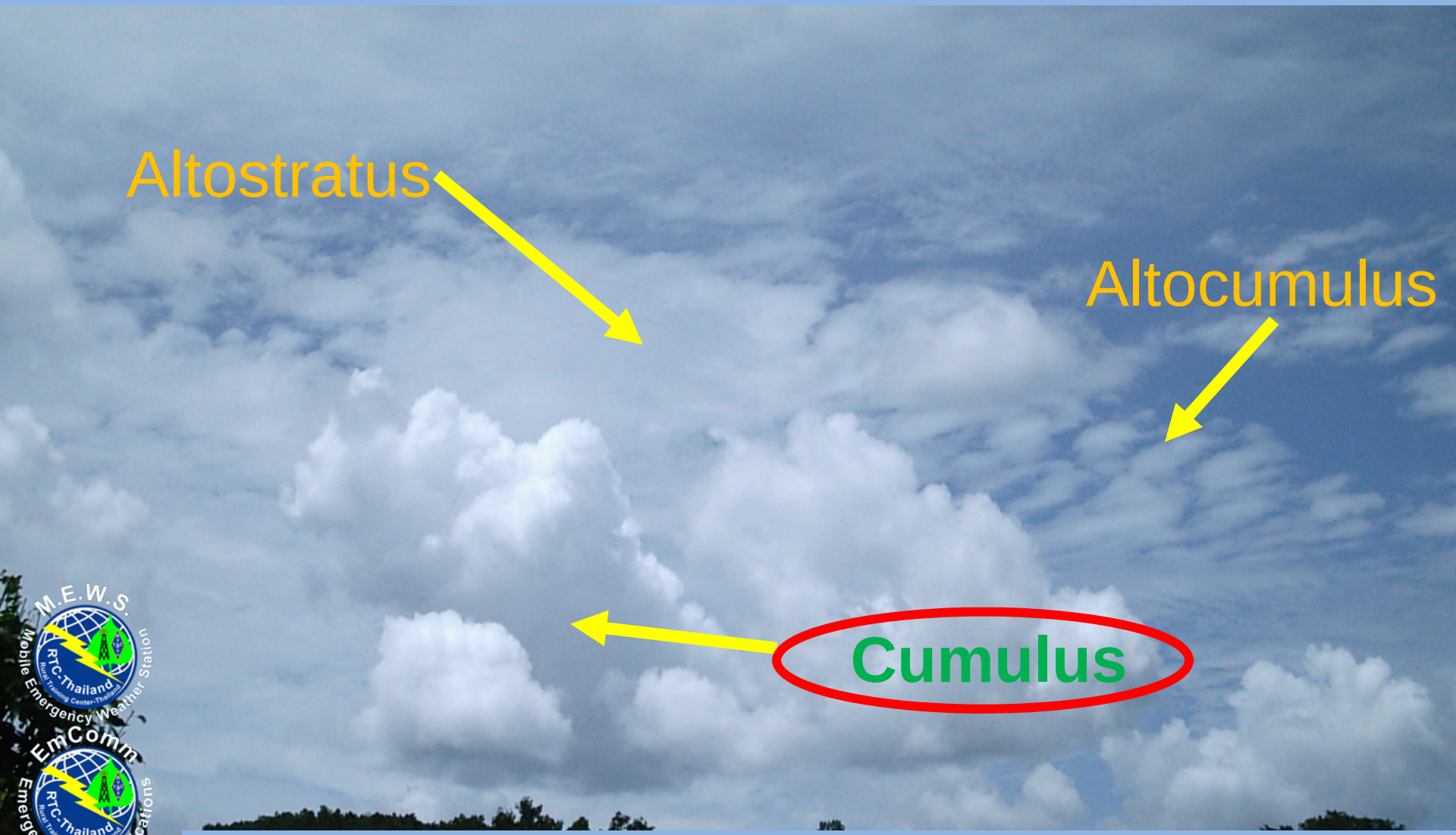
Try to match the cloud shapes to the names.



Look at the chart for the altitude group of the clouds you see.

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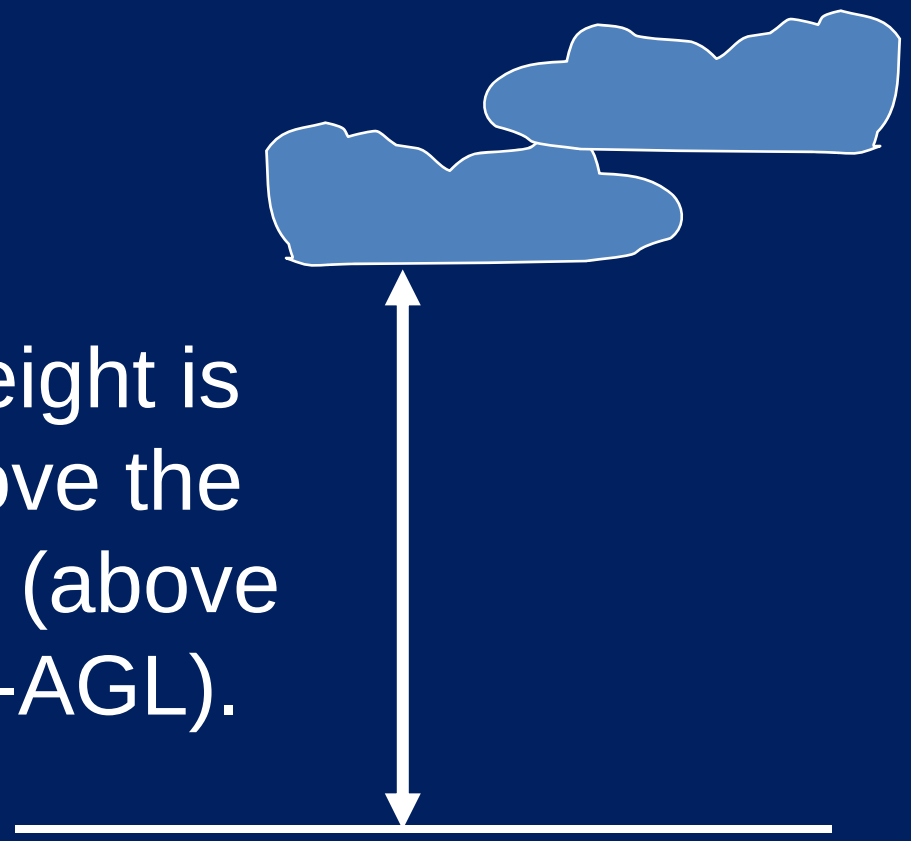
Height of the Cloud Base



Cloud base height is measured above the Earth's surface (above ground level---AGL).

There may be different types of clouds forming at different altitudes above the ground. Always report the height of the lowest cloud base for your area.

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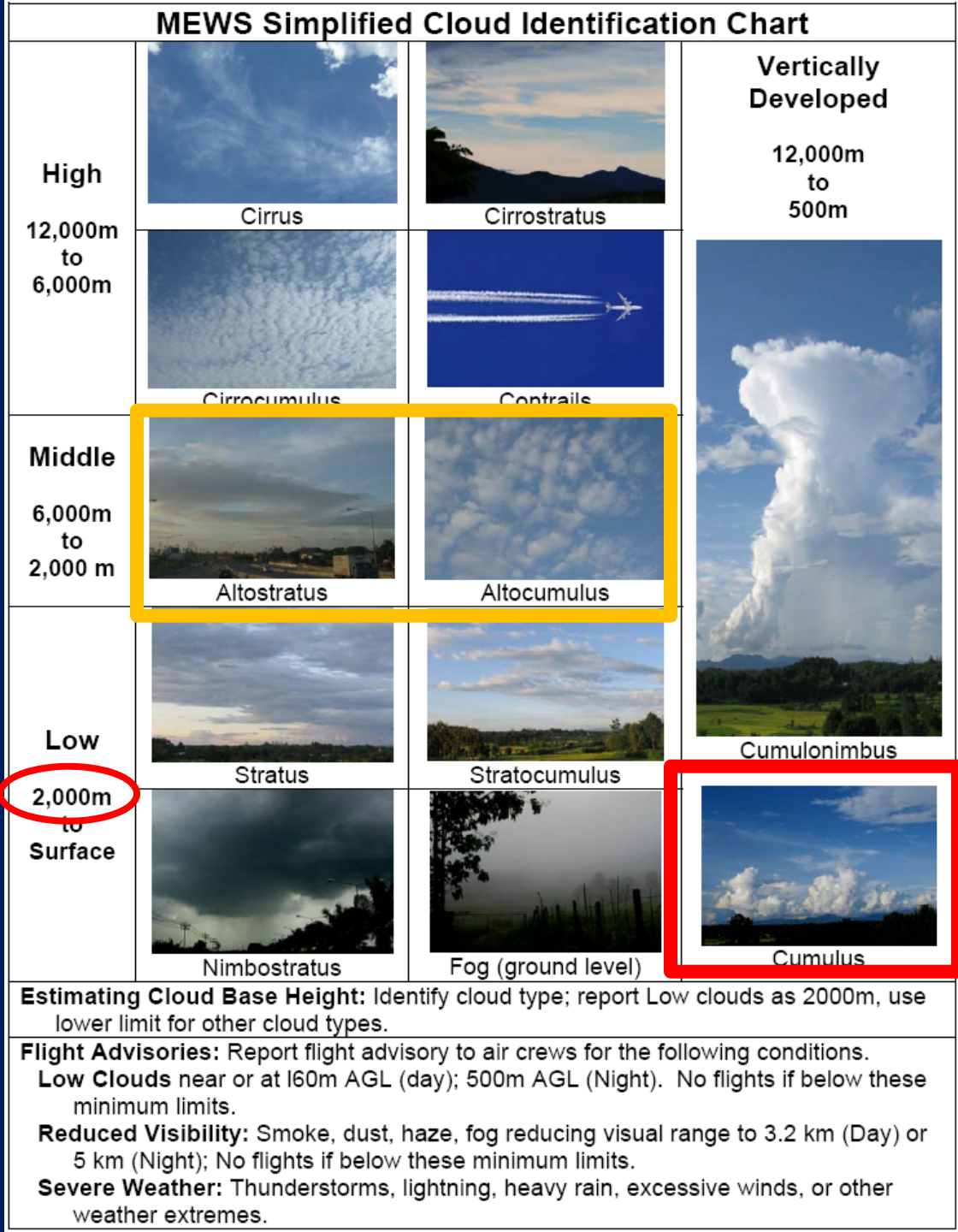
Use the Cloud Identification Chart in the MEWS Weather Observer Handbook.

Of the clouds you see, pick the type with the lowest altitude range. The cumulus cloud was the lowest. Report "up to 2,000m" as the altitude since it clearly was not at ground level.



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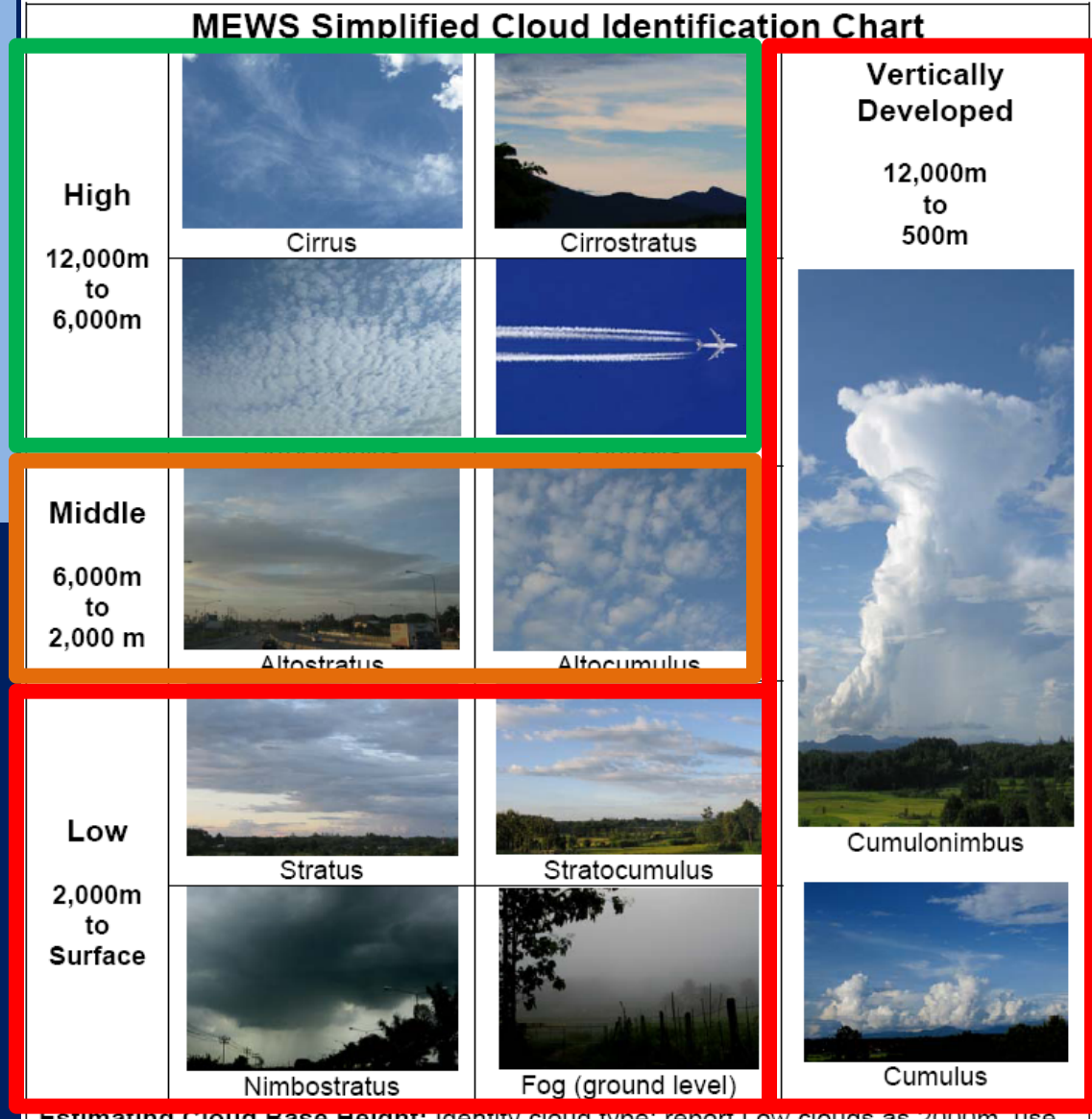
For helicopter flight operations in Nan Province, the Low and Vertically Developed Clouds are very important.

For helicopters
High = **OK**
Middle = **Maybe** (check if high mountains are present)
Low = **Dangerous** conditions could exist; ***give flight advisories when necessary*** →



Estimating Cloud Base Height: Identify cloud type; report Low clouds as 2000m, use lower limit for other cloud types.

Flight Advisories: Report flight advisory to air crews for the following conditions.

Low Clouds near or at l60m AGL (day); 500m AGL (Night). No flights if below these minimum limits.

Reduced Visibility: Smoke, dust, haze, fog reducing visual range to 3.2 km (Day) or 5 km (Night); No flights if below these minimum limits.

Severe Weather: Thunderstorms, lightning, heavy rain, excessive winds, or other weather extremes.

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The main concern is the clouds that could affect helicopter flight operations

If reporting 500m cloud base height, try to confirm this height relative to a local feature or by using the Dew Point Method.

The Dew Point Method is more precise. It is in Advanced MEWS Lesson A3.

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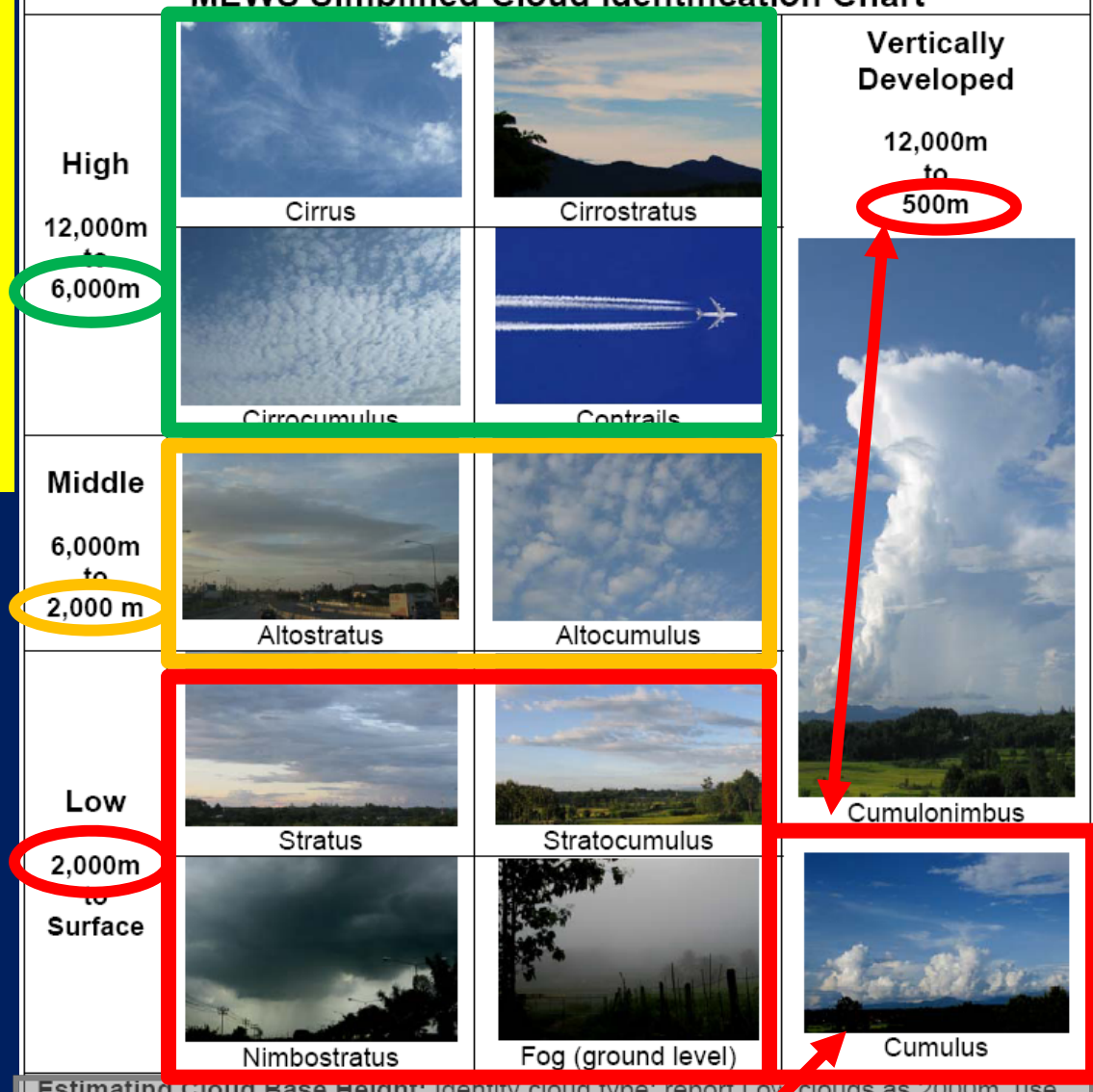
MEWS Simplified Cloud Identification Chart



Estimating Cloud Base Height: Identify cloud type; report Low clouds as 2000m; use lower limit for other cloud types.

Flight Advisories: Report flight advisory to air crews for the following conditions.

- **Low Clouds** near or at l60m AGL (day); 500m AGL (Night). No flights if below these minimum limits.
- **Reduced Visibility:** Smoke, dust, haze, fog reducing visual range to 3.2 km (Day) or 5 km (Night); No flights if below these minimum limits.
- **Severe Weather:** Thunderstorms, lightning, heavy rain, excessive winds, or other weather extremes.

Flight Advisory

Report a Flight Advisory any time cloud base height is ***near to, at, or less*** than the warning limits listed on the Log Form.

This is difficult to do using the Cloud ID chart method.

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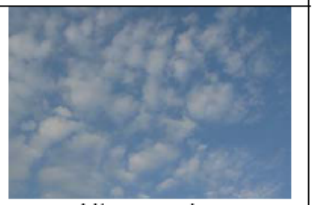
MEWS Simplified Cloud Identification Chart

High 12,000m to 6,000m	Cirrus	Cirrostratus	**Vertically Developed** 12,000m to 500m
	Cirrocumulus	Contrails	Cumulonimbus
Middle 6,000m to 2,000 m	Altostratus	 Altocumulus	
Low 2,000m to Surface	Stratus	Stratocumulus	
	Nimbostratus	Fog (ground level)	Cumulus

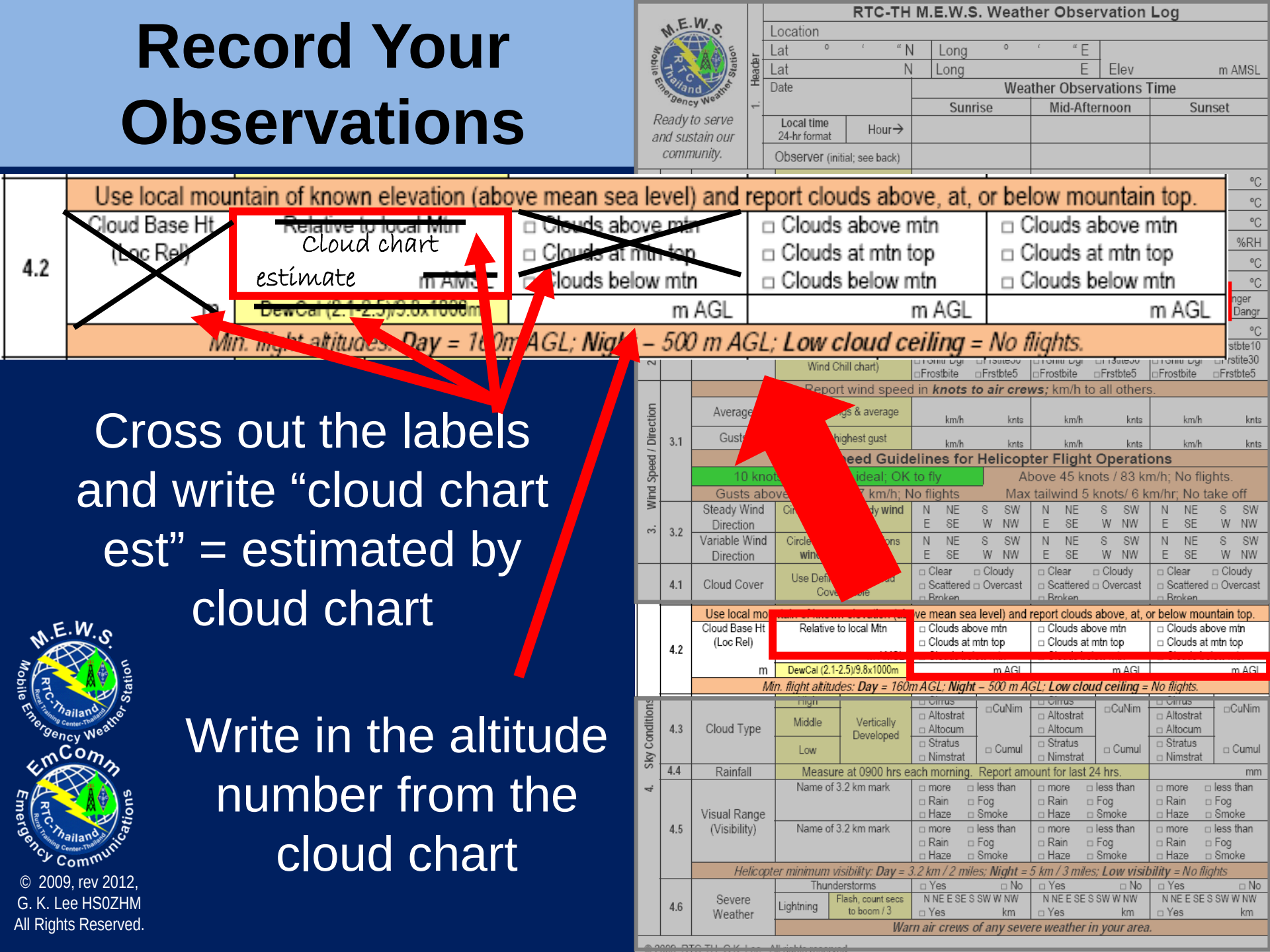
Estimating Cloud Base Height: Identify cloud type; report Low clouds as 2000m, use lower limit for other cloud types.

Low Clouds near or at l60m AGL (day); 500m AGL (Night). No flights if below these minimum limits.

Reduced Visibility: Smoke, dust, haze, fog reducing visual range to 3.2 km (Day) or 5 km (Night); No flights if below these minimum limits.

Severe Weather: Thunderstorms, lightning, heavy rain, excessive winds, or other weather extremes.

Record Your Observations



Cross out the labels and write "cloud chart est" = estimated by cloud chart

Write in the altitude number from the cloud chart

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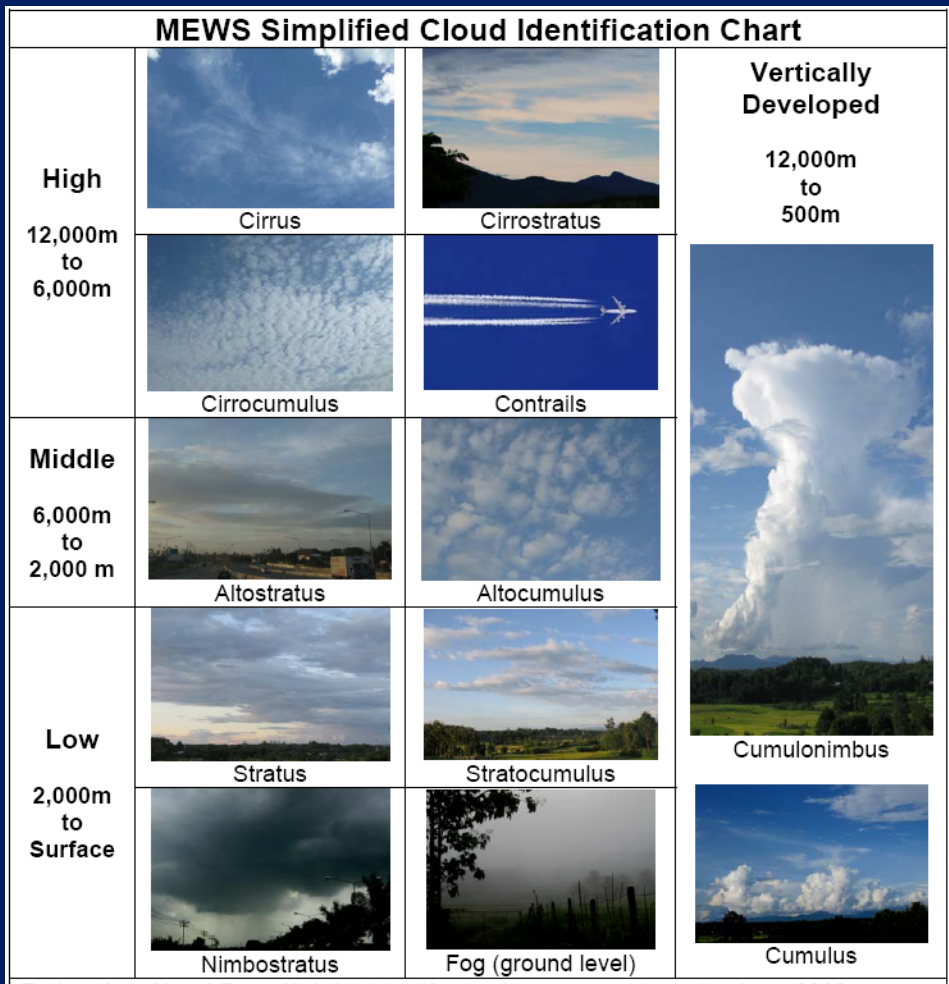
Caution: This is a very general estimate.

The chart only shows ranges of altitudes for the different cloud types. It doesn't tell the pilot the actual height of the cloud base. Use with cloud type helps flight crews.



Estimating Cloud Base Height: Identify cloud type; report Low clouds as 2000m, use lower limit for other cloud types.

Flight Advisories: Report flight advisory to air crews for the following conditions.

Low Clouds near or at l60m AGL (day); 500m AGL (Night). No flights if below these minimum limits.

Reduced Visibility: Smoke, dust, haze, fog reducing visual range to 3.2 km (Day) or 5 km (Night); No flights if below these minimum limits.

Severe Weather: Thunderstorms, lightning, heavy rain, excessive winds, or other weather extremes.

It is better to make this estimate relative to a local mountain or to calculate it using the Dew Point Method in MEWS Lesson A3

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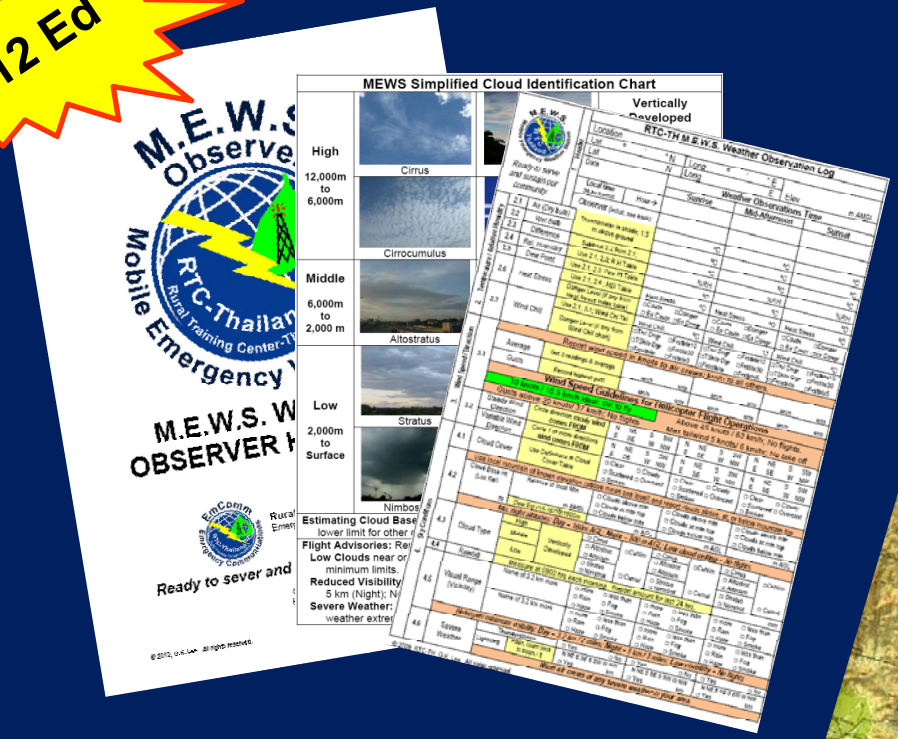
What you need to make a Basic Estimation of Cloud Base Height Relative to a Local Mountain

2012 Ed

Pencil



MEWS Handbook, Cloud Identification Chart, Cloud Cover Chart, and Log Form

Topographic Map of your area

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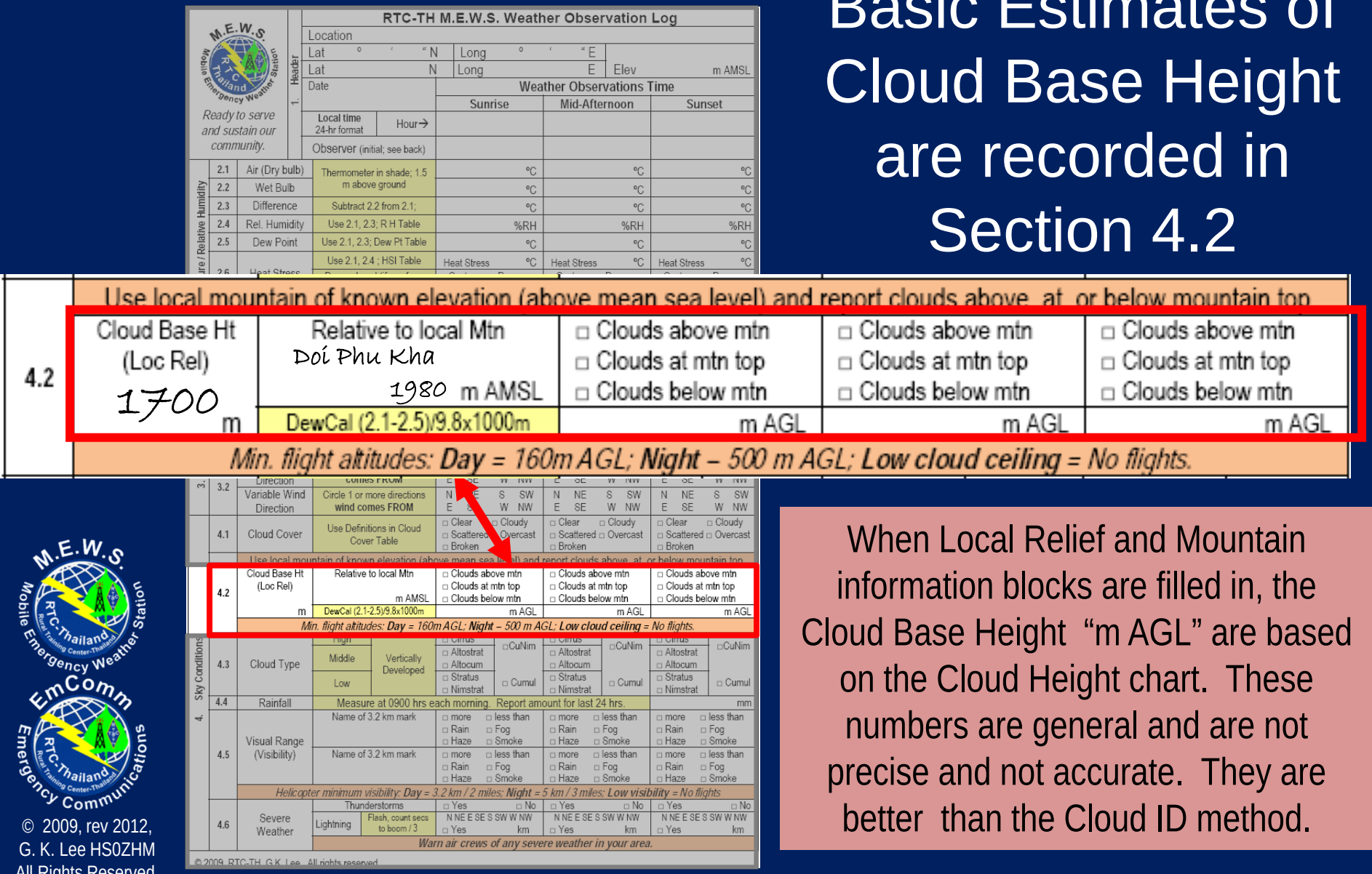
The MEWS Weather Observation Log Form

Basic Estimates of Cloud Base Height are recorded in Section 4.2



RTC-TH M.E.W.S. Weather Observation Log

Location

Lat ° ' " N | Long ° ' " E

Lat N | Long E | Elev m AMSL

Date | Weather Observations Time: Sunrise | Mid-Afternoon | Sunset

Local time 24-hr format | Hour→

Observer (initial; see back)

2.1	Air (Dry bulb)	Thermometer in shade; 1.5 m above ground	°C	°C	°C
2.2	Wet Bulb		°C	°C	°C
2.3	Difference	Subtract 2.2 from 2.1;	°C	°C	°C
2.4	Rel. Humidity	Use 2.1, 2.3; R H Table	%RH	%RH	%RH
2.5	Dew Point	Use 2.1, 2.3; Dew Pt Table	°C	°C	°C
2.6	Heat Stress	Use 2.1, 2.4 ; HSI Table	Heat Stress °C	Heat Stress °C	Heat Stress °C

Use local mountain of known elevation (above mean sea level) and report clouds above, at, or below mountain top

4.2	Cloud Base Ht (Loc Rel) 1700 m	Relative to local Mtn Doi Phu Kha 1980 m AMSL	☐ Clouds above mtn ☐ Clouds at mtn top ☐ Clouds below mtn	☐ Clouds above mtn ☐ Clouds at mtn top ☐ Clouds below mtn	☐ Clouds above mtn ☐ Clouds at mtn top ☐ Clouds below mtn
		DewCal (2.1-2.5)/9.8x1000m	m AGL	m AGL	m AGL

Min. flight altitudes: **Day** = 160m AGL; **Night** – 500 m AGL; **Low cloud ceiling** = No flights.

3.2	Variable Wind Direction	Circle 1 or more directions wind comes FROM	N NE E SE S SW W NW	N NE E SE S SW W NW	N NE E SE S SW W NW
4.1	Cloud Cover	Use Definitions in Cloud Cover Table	☐ Clear ☐ Cloudy ☐ Scattered ☐ Overcast ☐ Broken	☐ Clear ☐ Cloudy ☐ Scattered ☐ Overcast ☐ Broken	☐ Clear ☐ Cloudy ☐ Scattered ☐ Overcast ☐ Broken
4.2	Cloud Base Ht (Loc Rel) m	Relative to local Mtn m AMSL	☐ Clouds above mtn ☐ Clouds at mtn top ☐ Clouds below mtn	☐ Clouds above mtn ☐ Clouds at mtn top ☐ Clouds below mtn	☐ Clouds above mtn ☐ Clouds at mtn top ☐ Clouds below mtn
		DewCal (2.1-2.5)/9.8x1000m	m AGL	m AGL	m AGL
4.3	Cloud Type	High / Middle / Low; Vertically Developed	☐ Cirrus ☐ Altostrat ☐ Altocum ☐ Stratus ☐ Nimstrat ☐ CuNim ☐ Cumul	☐ Cirrus ☐ Altostrat ☐ Altocum ☐ Stratus ☐ Nimstrat ☐ CuNim ☐ Cumul	☐ Cirrus ☐ Altostrat ☐ Altocum ☐ Stratus ☐ Nimstrat ☐ CuNim ☐ Cumul
4.4	Rainfall	Measure at 0900 hrs each morning. Report amount for last 24 hrs.			mm
4.5	Visual Range (Visibility)	Name of 3.2 km mark	☐ more ☐ less than ☐ Rain ☐ Fog ☐ Haze ☐ Smoke	☐ more ☐ less than ☐ Rain ☐ Fog ☐ Haze ☐ Smoke	☐ more ☐ less than ☐ Rain ☐ Fog ☐ Haze ☐ Smoke
		Name of 3.2 km mark	☐ more ☐ less than ☐ Rain ☐ Fog ☐ Haze ☐ Smoke	☐ more ☐ less than ☐ Rain ☐ Fog ☐ Haze ☐ Smoke	☐ more ☐ less than ☐ Rain ☐ Fog ☐ Haze ☐ Smoke
		Helicopter minimum visibility: **Day** = 3.2 km / 2 miles; **Night** = 5 km / 3 miles; **Low visibility** = No flights			
4.6	Severe Weather	Thunderstorms	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
		Lightning: Flash, count secs to boom / 3	N NE E SE S SW W NW ☐ Yes km	N NE E SE S SW W NW ☐ Yes km	N NE E SE S SW W NW ☐ Yes km
		Warn air crews of any severe weather in your area.			

When Local Relief and Mountain information blocks are filled in, the Cloud Base Height "m AGL" are based on the Cloud Height chart. These numbers are general and are not precise and not accurate. They are better than the Cloud ID method.

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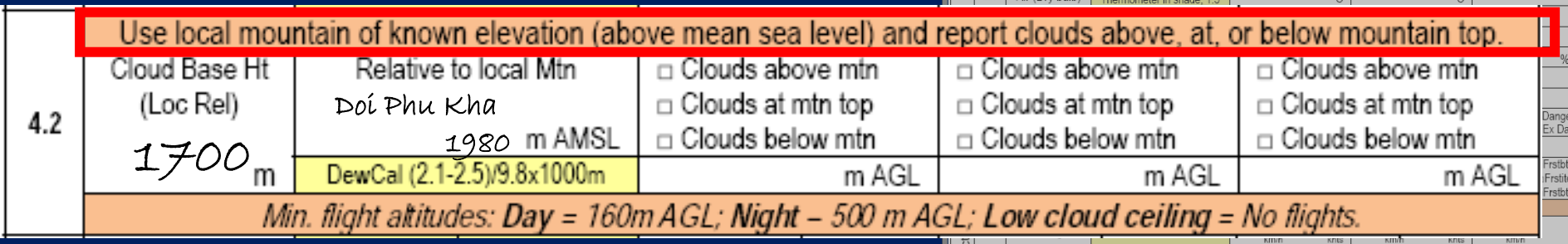
The MEWS Weather Observation Log Form

Brief instructions are on the front of the Log form.



Additional notes are on the back of the form. Full instructions and all needed reference tables are in the MEWS Weather Observer Handbook.

See Handbook: 4.2.1 (Cloud Base Height Ceiling) Relative to a local mountain of known elevation, p. 22

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The notes on the back of the log form

More notes are on the back of the Log form.

4.2 Cloud Base Height: If relative to a local mountain, give its name and elevation above mean sea level. If using the Dew Point method, subtract Dew point temp (2.5) from Dry temp (2.1) and divide result by 10; multiply quotient by 1000m. *Advise air crews when cloud base height (ceiling) are close to affecting helicopter flight operations.*

Full instructions and all needed reference tables are in the MEWS Weather Observer Handbook.

See Handbook: 4.2.1 (Cloud Base Height Ceiling) Relative to a local mountain of known elevation, p. 22

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All weather observers write their initials and clearly print their name using block letters

M.E.W.S. Summary Weather Observation Log Instructions

Header
Location: Local Place Name
Latitude, Longitude from GPS, survey records or

RTC-TH M.E.W.S. Weather Observation Log

Sky Conditions

4.2 Cloud Base Height: If relative to a local mountain, give its name and elevation above mean sea level. Note Local Relief in meters. If using the Dew Point method, subtract Dew point temp (2.5) from Dry temp (2.1) and divide result by 9.8; multiply quotient by 1000m. *Advise air crews when cloud base height (ceiling) are close to affecting helicopter flight operations.*

4.3 Cloud Type: Check the appropriate box based on cloud description in the guide book

4.4 Rainfall: Measure water in rain gauge each day at 0900 hrs. Rain gauge should be in open area, away from tall objects, with top of gauge 50 cm above ground to avoid splash water from entering gauge.

4.5 Visual Range: Pick landmarks 3.2 km and 5 km from your observation site. Report when visual range is more or less than the known distances to these landmarks. *Advise air crews when visual range is close to affecting helicopter flight operations.* Check appropriate boxes for reasons of reduced visibility.

4.6 Severe Weather: Primary concerns and thunderstorms and lightning. Check the appropriate boxes. If lighting, watch for flash, count seconds until you hear the thunder, multiply by 3 = approximate distance in km. Circle direction to storm.

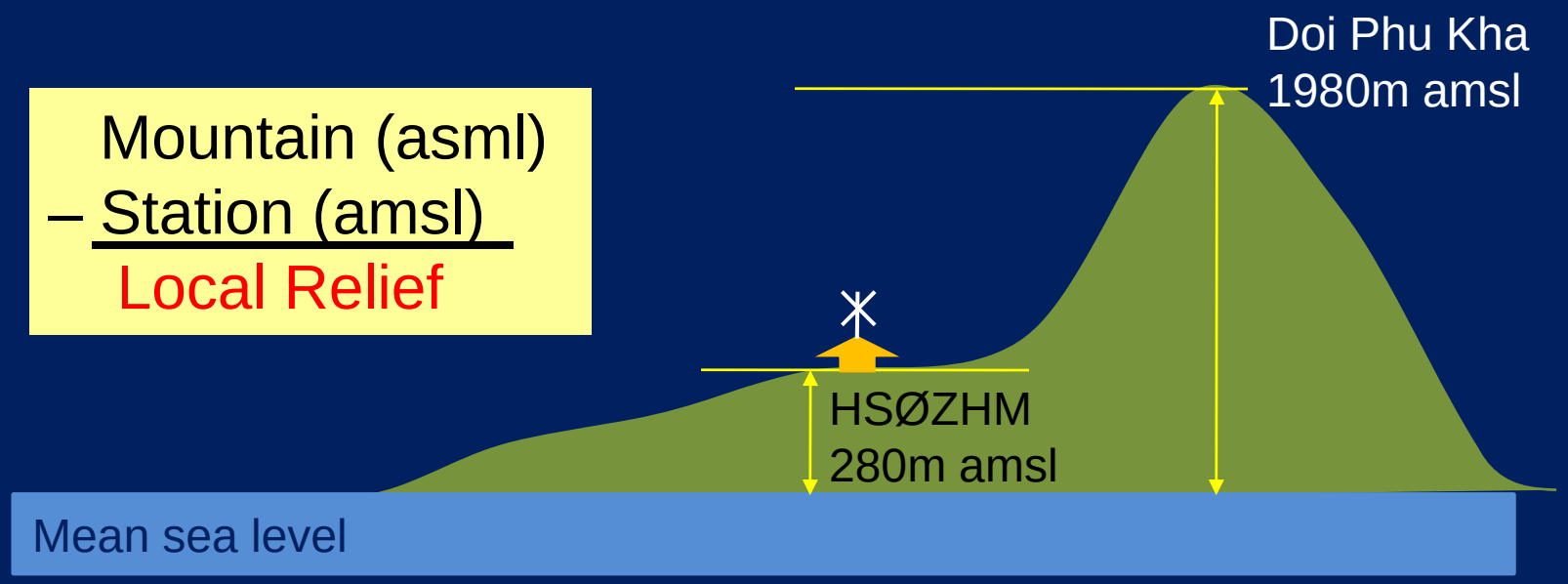
To estimate cloud base height relative to a local mountain…

…you need to know the following:

1) Elevation of the local mountain (amsl)
2) Elevation of your operating position (amsl)
3) You local relief (“0” reference for AGL)

amsl = above mean sea level AGL = above ground level

Mountain (asml)
– Station (amsl)
Local Relief



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Doi Phu Kha is close to the station of HSØZHM.

This local mountain can be used to estimate the cloud base height. But first, you need to do some homework.

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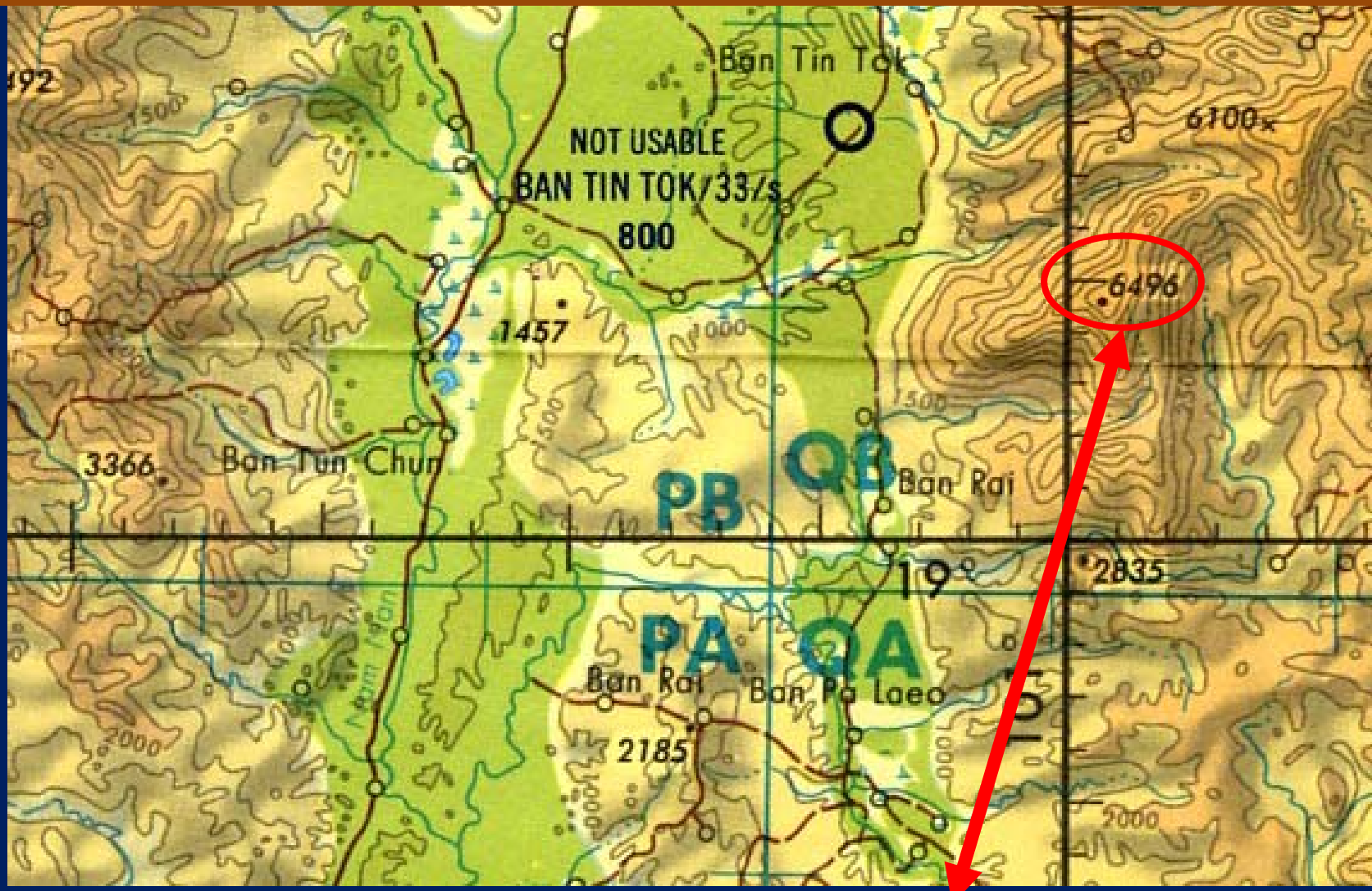
Local Mountain Elevation Data Source



The elevation of Doi Phu Kha from this topographic map is 1980 m / 6496 ft asml.

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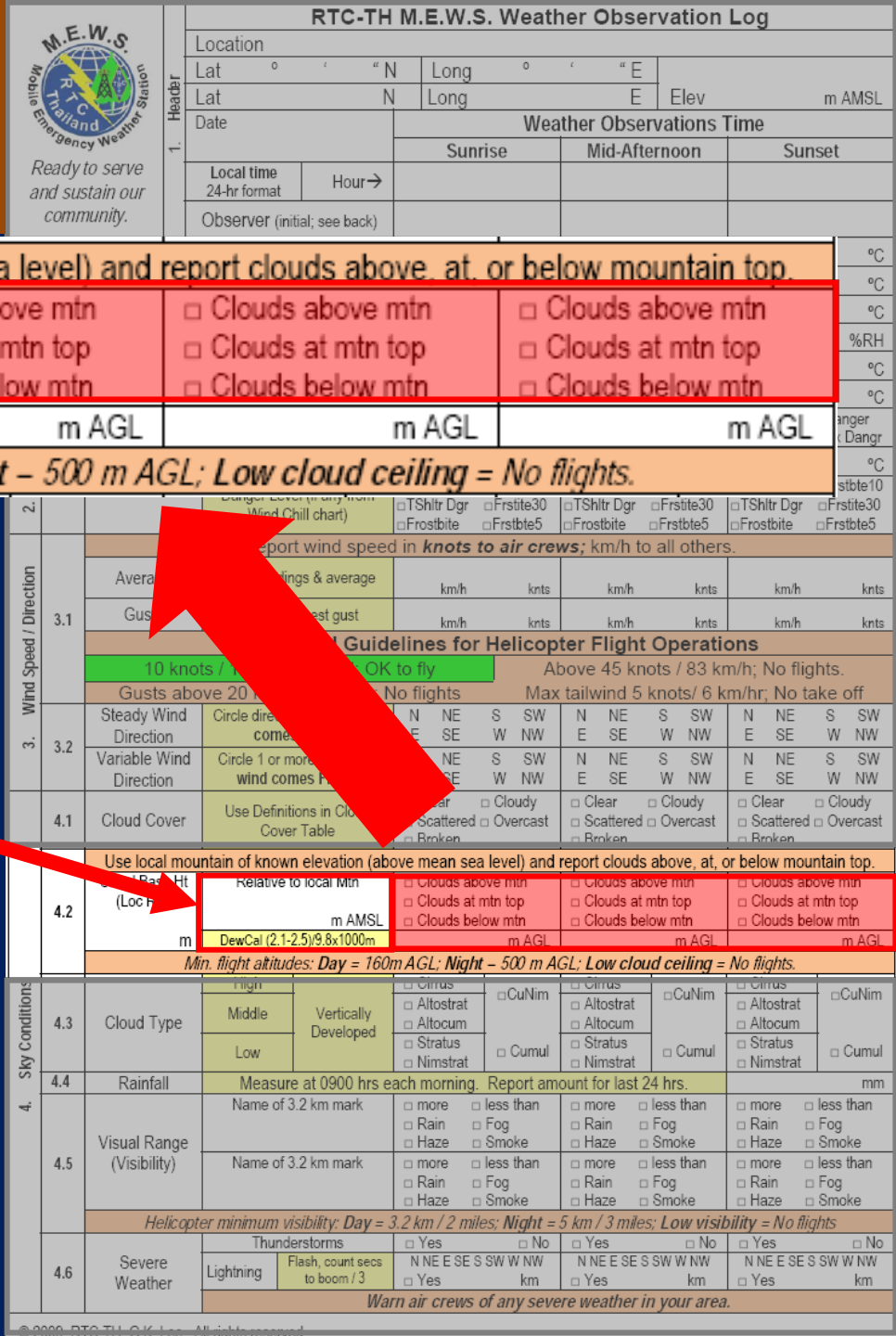
Local Mountain Elevation



Record the name of the local mountain and its elevation above mean sea level (amsl) in the upper part of Line 4.2

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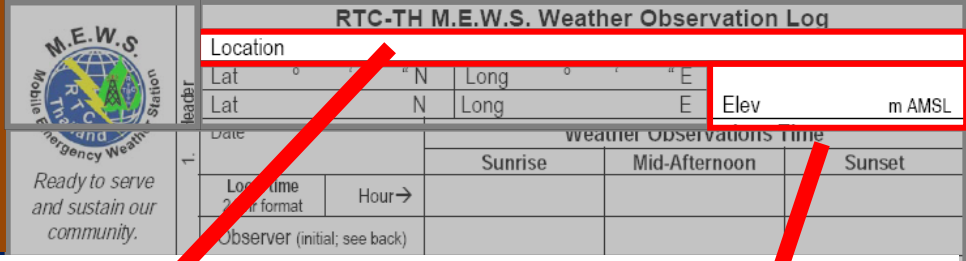
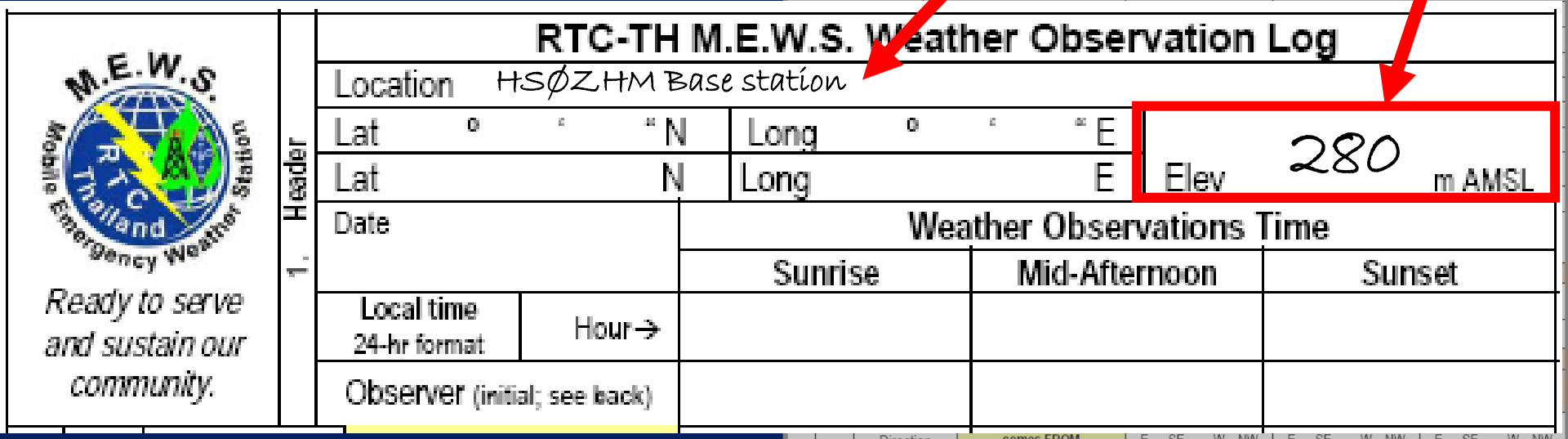
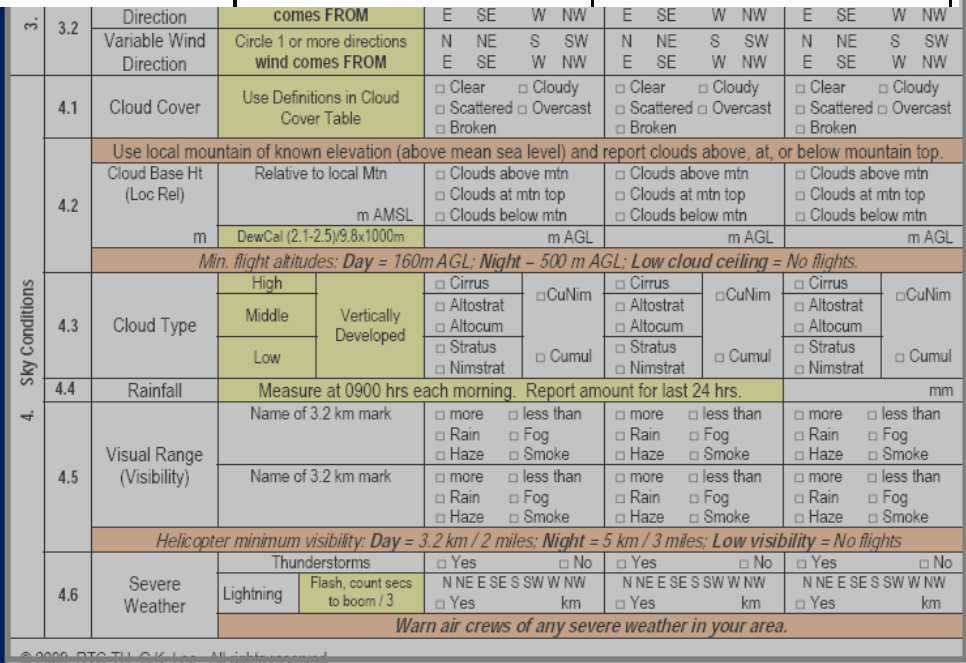
Your Station Elevation





This data should be recorded in the header section of the MEWS Log Form.

Sources for this data are given in the MEWS Log Form lesson (MEWS Lesson OC).



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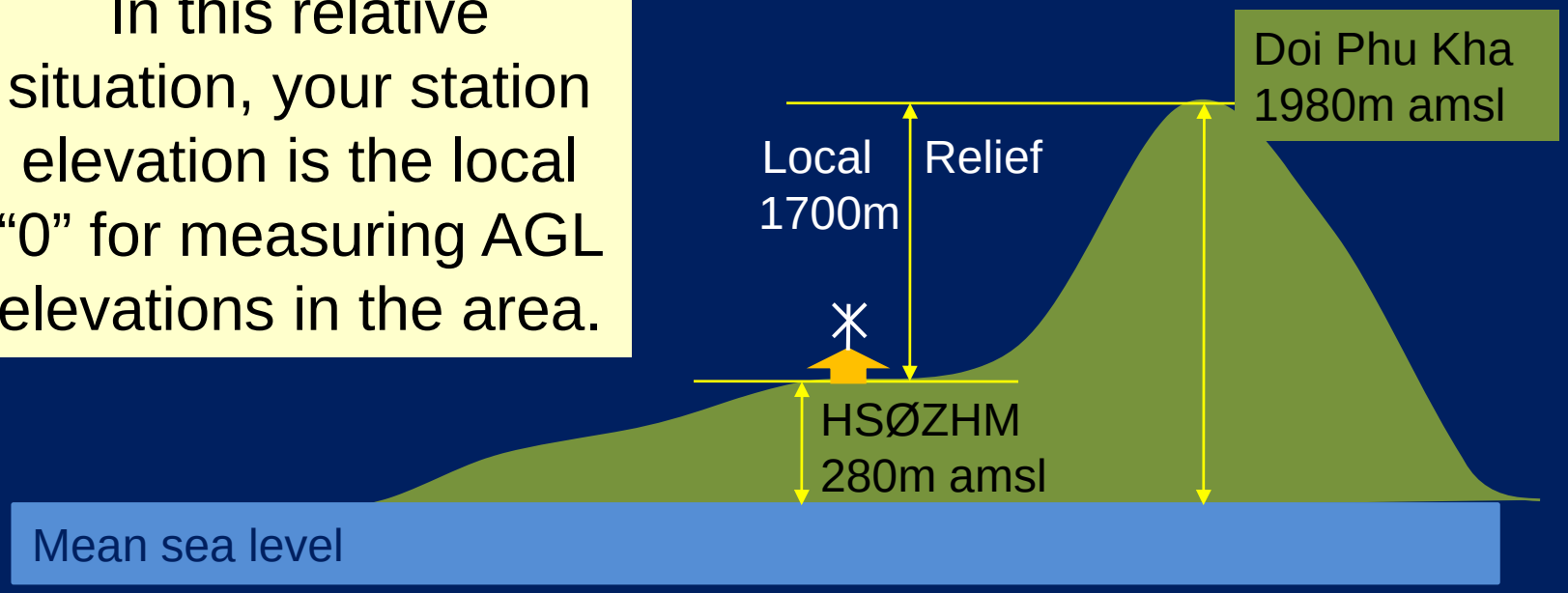
Calculating Local Relief

Local Relief = Mountain (amsl) – Station (amsl)

1980 m (asml)
– 280 m (amsl)
1700 m Local Relief

In this relative situation, your station elevation is the local "0" for measuring AGL elevations in the area.



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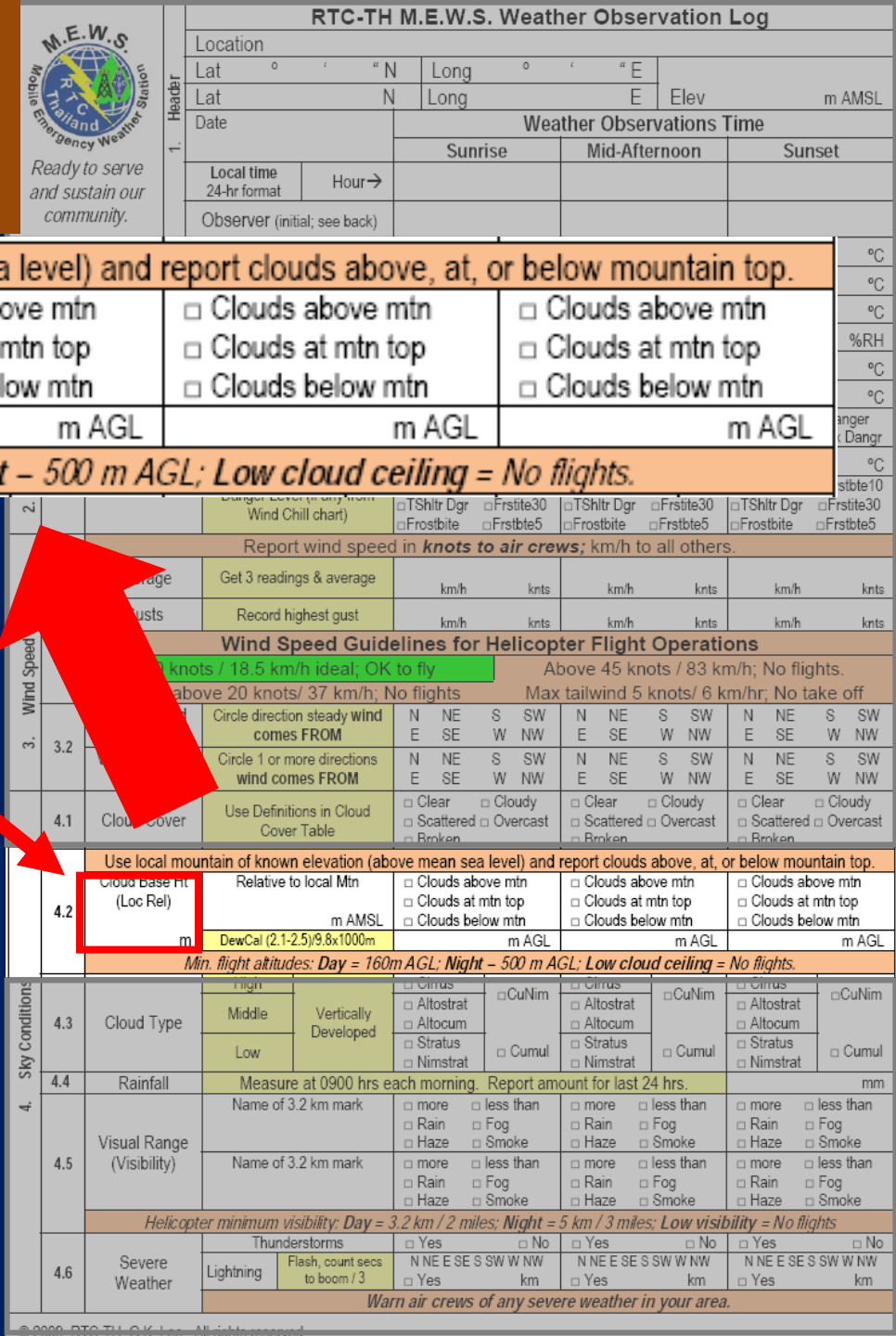
Record Your Local Relief Result



Record the result of your local relief calculation on Line 4.2

Use this number to give Cloud Base Height relative to Doi Phu Kha. If clouds at mountain top, report "cloud base height 1700m AGL"

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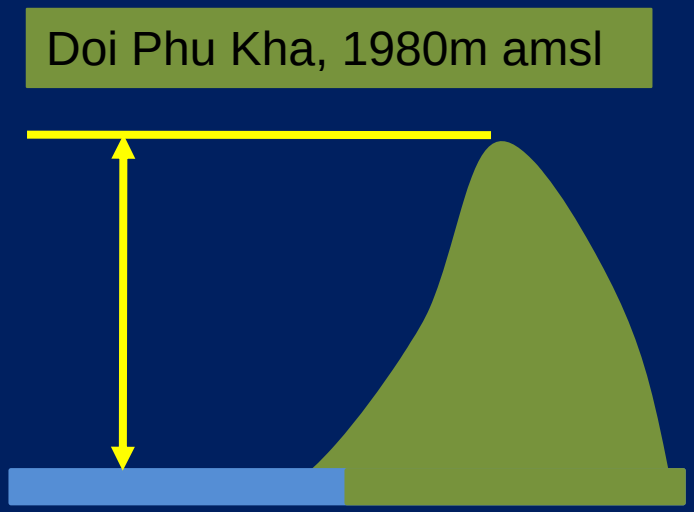
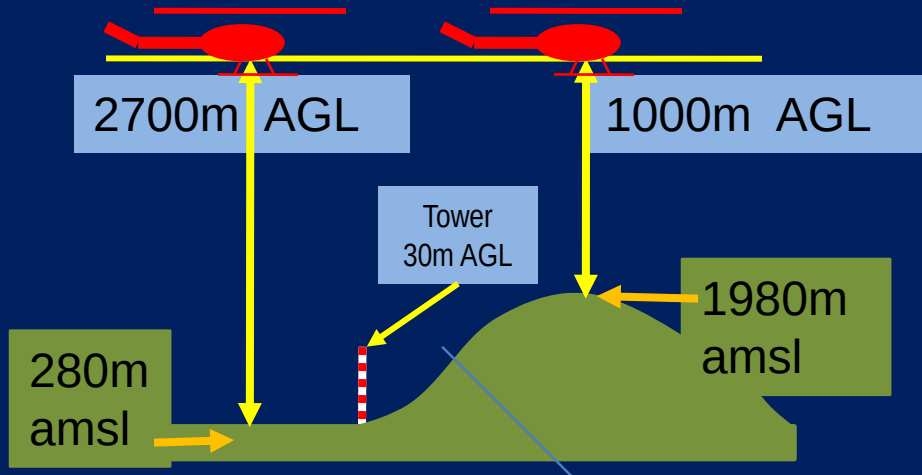
Two ways to report elevations





Terrain Features
Use ***amsl*** for the height a terrain features (e.g. mountains, your operating location) above mean sea level.

Flight Operations
Use **AGL** local reports of weather conditions or any vertical hazards to aircraft active in your area.

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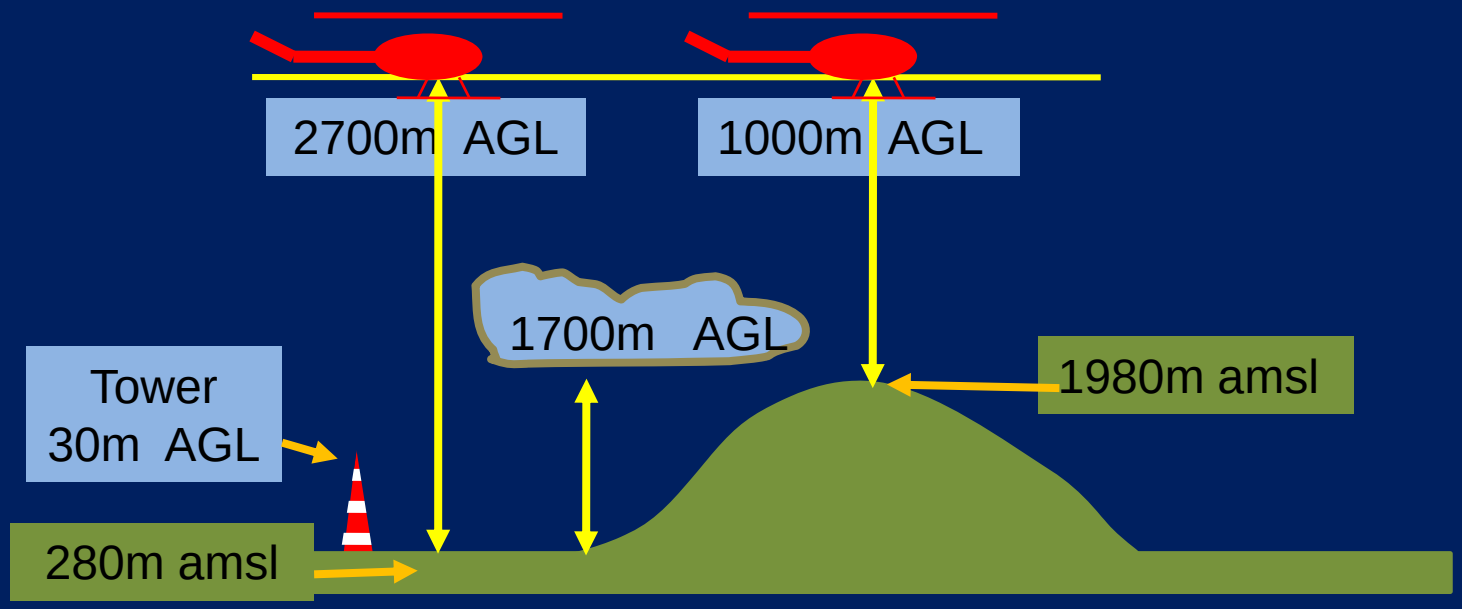
MEWS Elevation Reports: What & How



Terrain Features use (amsl) above mean sea level

- Your station elevation
- LZ elevation
- Local terrain features

Flight Operations use (AGL) above ground level

- Cloud base height
- LZ approaches/departures
- LZ vertical obstacles

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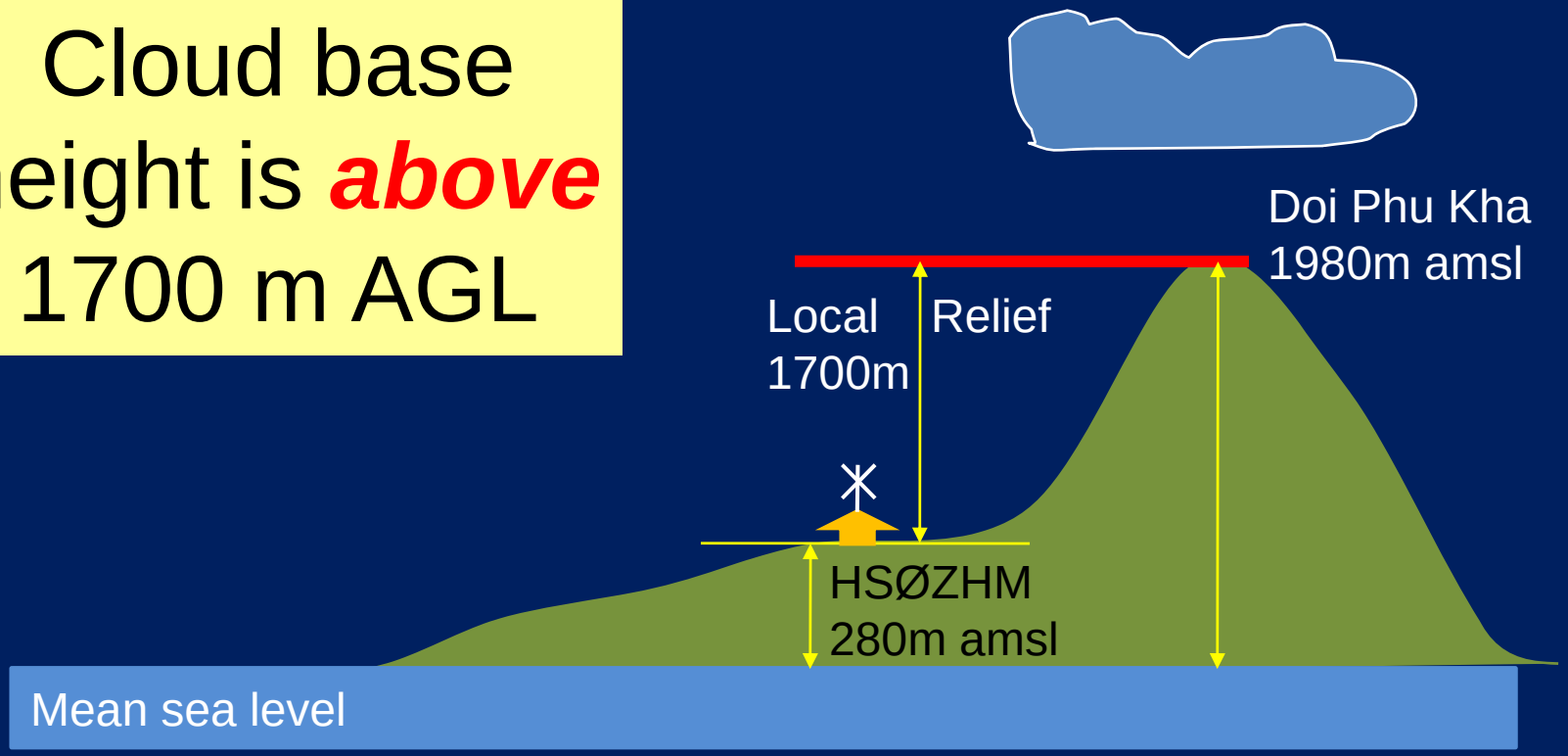
Cloud Base Height relative to Doi Phu Kha

Cloud base height is ***above*** 1700 m AGL



Doi Phu Kha is 1980m amsl and is 1700m AGL from station HSØZHM

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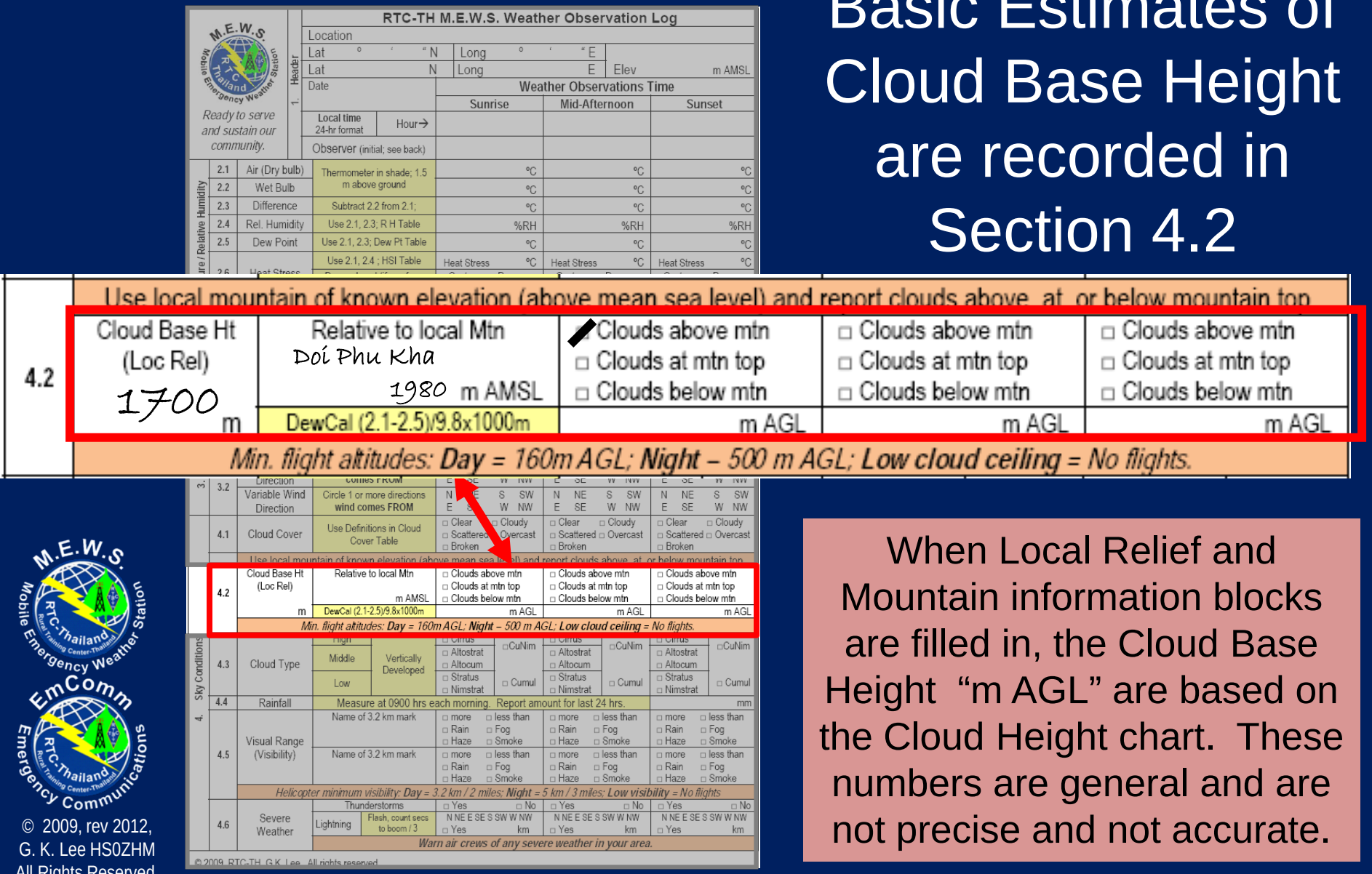
The MEWS Weather Observation Log Form

Basic Estimates of Cloud Base Height are recorded in Section 4.2



RTC-TH M.E.W.S. Weather Observation Log

Location

Lat ° ' " N | Long ° ' " E

Lat N | Long E | Elev m AMSL

Date | Weather Observations Time: Sunrise | Mid-Afternoon | Sunset

Local time 24-hr format | Hour→

Observer (initial; see back)

2.1	Air (Dry bulb)	Thermometer in shade; 1.5 m above ground	°C	°C	°C
2.2	Wet Bulb		°C	°C	°C
2.3	Difference	Subtract 2.2 from 2.1;	°C	°C	°C
2.4	Rel. Humidity	Use 2.1, 2.3; R H Table	%RH	%RH	%RH
2.5	Dew Point	Use 2.1, 2.3; Dew Pt Table	°C	°C	°C
2.6	Heat Stress	Use 2.1, 2.4 ; HSI Table	Heat Stress °C	Heat Stress °C	Heat Stress °C

Use local mountain of known elevation (above mean sea level) and report clouds above, at, or below mountain top

4.2	Cloud Base Ht (Loc Rel) 1700 m	Relative to local Mtn Doi Phu Kha 1980 m AMSL	☑ Clouds above mtn ☐ Clouds at mtn top ☐ Clouds below mtn	☐ Clouds above mtn ☐ Clouds at mtn top ☐ Clouds below mtn	☐ Clouds above mtn ☐ Clouds at mtn top ☐ Clouds below mtn
		DewCal (2.1-2.5)/9.8x1000m	m AGL	m AGL	m AGL

Min. flight altitudes: **Day** = 160m AGL; **Night** – 500 m AGL; **Low cloud ceiling** = No flights.

3.2	Variable Wind Direction	Circle 1 or more directions wind comes FROM	N NE E SE S SW W NW	N NE E SE S SW W NW	N NE E SE S SW W NW
4.1	Cloud Cover	Use Definitions in Cloud Cover Table	☐ Clear ☐ Cloudy ☐ Scattered ☐ Overcast ☐ Broken	☐ Clear ☐ Cloudy ☐ Scattered ☐ Overcast ☐ Broken	☐ Clear ☐ Cloudy ☐ Scattered ☐ Overcast ☐ Broken
4.2	Cloud Base Ht (Loc Rel) m	Relative to local Mtn m AMSL	☐ Clouds above mtn ☐ Clouds at mtn top ☐ Clouds below mtn	☐ Clouds above mtn ☐ Clouds at mtn top ☐ Clouds below mtn	☐ Clouds above mtn ☐ Clouds at mtn top ☐ Clouds below mtn
		DewCal (2.1-2.5)/9.8x1000m	m AGL	m AGL	m AGL
4.3	Cloud Type	High / Middle / Low; Vertically Developed	☐ Cirrus ☐ Altostrat ☐ Altocum ☐ Stratus ☐ Nimstrat ☐ CuNim ☐ Cumul	☐ Cirrus ☐ Altostrat ☐ Altocum ☐ Stratus ☐ Nimstrat ☐ CuNim ☐ Cumul	☐ Cirrus ☐ Altostrat ☐ Altocum ☐ Stratus ☐ Nimstrat ☐ CuNim ☐ Cumul
4.4	Rainfall	Measure at 0900 hrs each morning. Report amount for last 24 hrs.			mm
4.5	Visual Range (Visibility)	Name of 3.2 km mark	☐ more ☐ less than ☐ Rain ☐ Fog ☐ Haze ☐ Smoke	☐ more ☐ less than ☐ Rain ☐ Fog ☐ Haze ☐ Smoke	☐ more ☐ less than ☐ Rain ☐ Fog ☐ Haze ☐ Smoke
		Name of 3.2 km mark	☐ more ☐ less than ☐ Rain ☐ Fog ☐ Haze ☐ Smoke	☐ more ☐ less than ☐ Rain ☐ Fog ☐ Haze ☐ Smoke	☐ more ☐ less than ☐ Rain ☐ Fog ☐ Haze ☐ Smoke
		Helicopter minimum visibility: **Day** = 3.2 km / 2 miles; **Night** = 5 km / 3 miles; **Low visibility** = No flights			
4.6	Severe Weather	Thunderstorms	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
		Lightning: Flash, count secs to boom / 3	N NE E SE S SW W NW ☐ Yes km	N NE E SE S SW W NW ☐ Yes km	N NE E SE S SW W NW ☐ Yes km
		Warn air crews of any severe weather in your area.			

When Local Relief and Mountain information blocks are filled in, the Cloud Base Height "m AGL" are based on the Cloud Height chart. These numbers are general and are not precise and not accurate.

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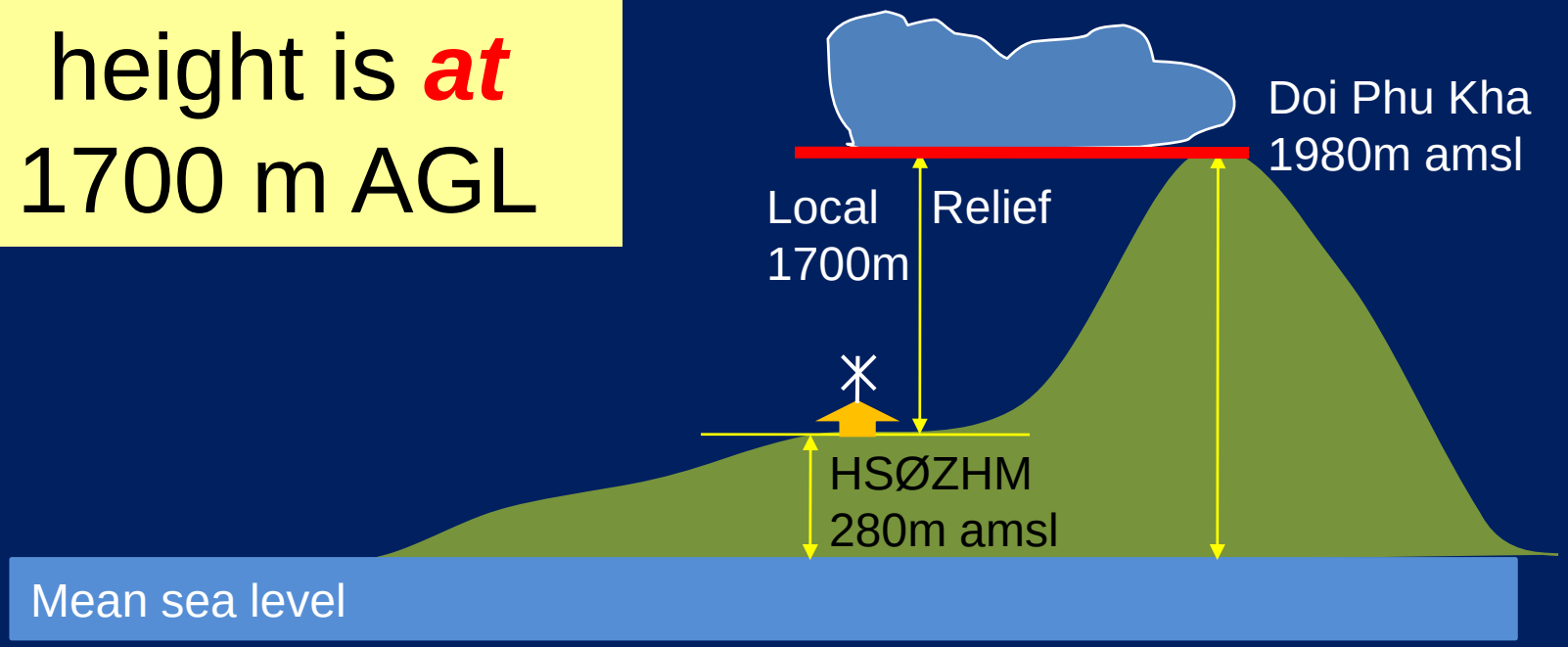
Cloud Base Height relative to Doi Phu Kha

Cloud base height is ***at*** 1700 m AGL



Doi Phu Kha is 1980m amsl and is 1700m AGL from station HSØZHM

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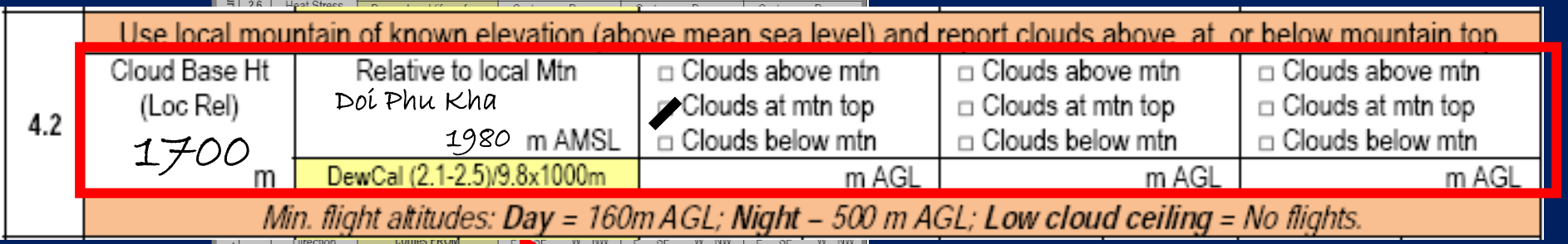
The MEWS Weather Observation Log Form

Basic Estimates of Cloud Base Height are recorded in Section 4.2



	Use local mountain of known elevation (above mean sea level) and report clouds above, at, or below mountain top				
4.2	Cloud Base Ht (Loc Rel) 1700 m	Relative to local Mtn Doi Phu Kha 1980 m AMSL	☐ Clouds above mtn ☐ Clouds at mtn top ☐ Clouds below mtn	☐ Clouds above mtn ☐ Clouds at mtn top ☐ Clouds below mtn	☐ Clouds above mtn ☐ Clouds at mtn top ☐ Clouds below mtn
		DewCal (2.1-2.5)/9.8x1000m	m AGL	m AGL	m AGL
	Min. flight altitudes: **Day** = 160m AGL; **Night** – 500 m AGL; **Low cloud ceiling** = No flights.				

When Local Relief and Mountain information blocks are filled in, the Cloud Base Height "m AGL" are based on the Cloud Height chart. These numbers are general and are not precise and not accurate.

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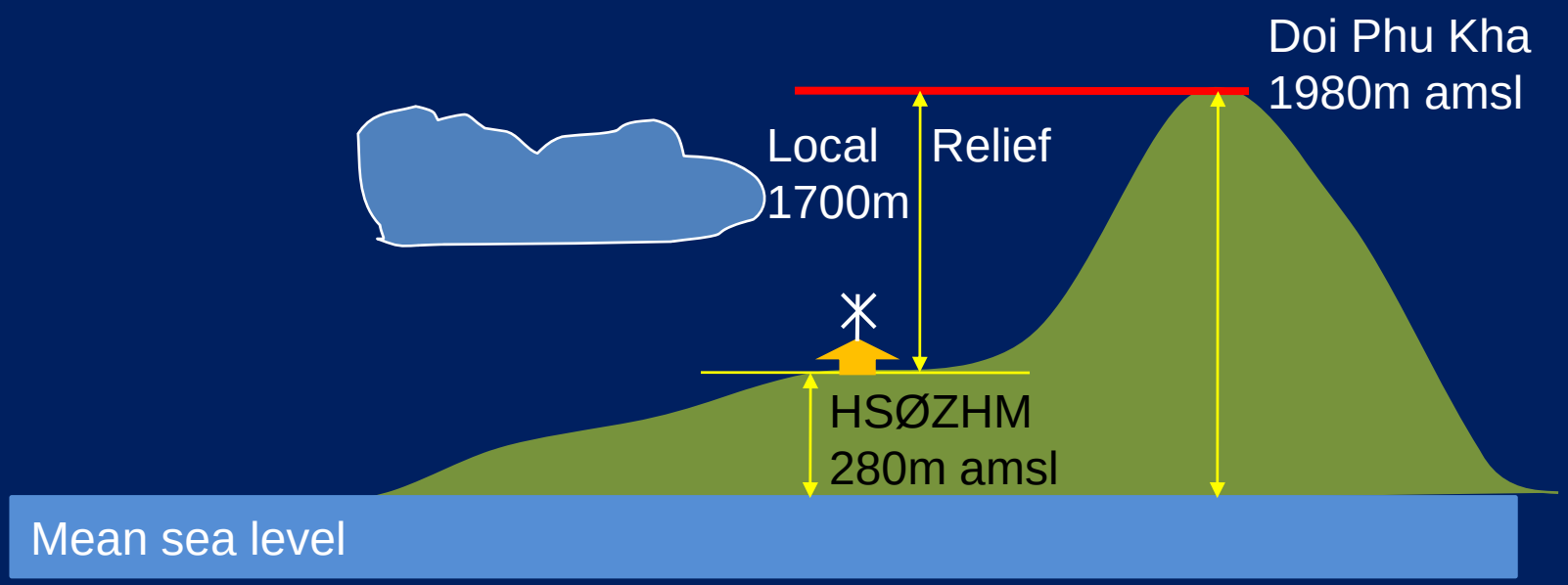
Cloud Base Height relative to Doi Phu Kha

Cloud base height is ***below***
1700 m AGL



Doi Phu Kha is 1980m amsl and is 1700m AGL from station HSØZHM

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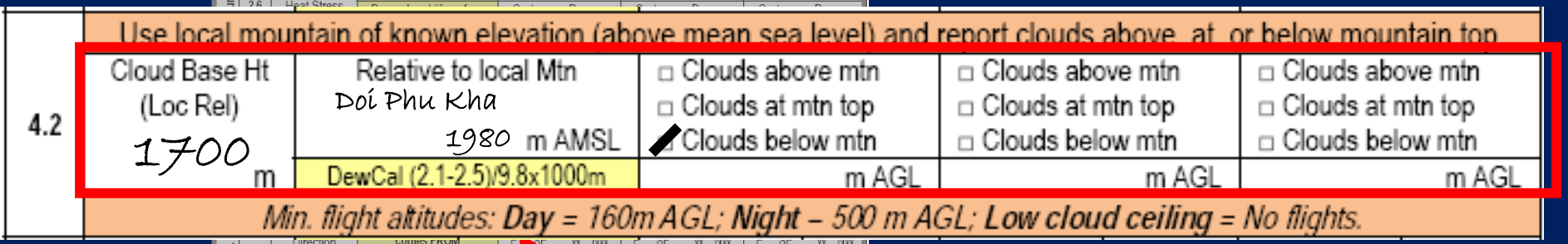
The MEWS Weather Observation Log Form

Basic Estimates of Cloud Base Height are recorded in Section 4.2



4.2	Use local mountain of known elevation (above mean sea level) and report clouds above, at, or below mountain top				
	Cloud Base Ht (Loc Rel) 1700 m	Relative to local Mtn Doi Phu Kha 1980 m AMSL	☐ Clouds above mtn ☐ Clouds at mtn top ☑ Clouds below mtn	☐ Clouds above mtn ☐ Clouds at mtn top ☐ Clouds below mtn	☐ Clouds above mtn ☐ Clouds at mtn top ☐ Clouds below mtn
		DewCal (2.1-2.5)/9.8x1000m	m AGL	m AGL	m AGL
	Min. flight altitudes: **Day** = 160m AGL; **Night** – 500 m AGL; **Low cloud ceiling** = No flights.				

When Local Relief and Mountain information blocks are filled in, the Cloud Base Height "m AGL" are based on the Cloud Height chart. These numbers are general and are not precise and not accurate.

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If a cloud touches Doi Phu Ka, it must be a type of Low Cloud.

Doi Phu Kha is only 1980 m amsl and **1700 m AGL** from my station. It is a cumulus cloud, which is a Low Cloud type. Low Clouds can form from **0-2000m AGL**. So these methods for estimating Cloud Base Height work and are consistent.

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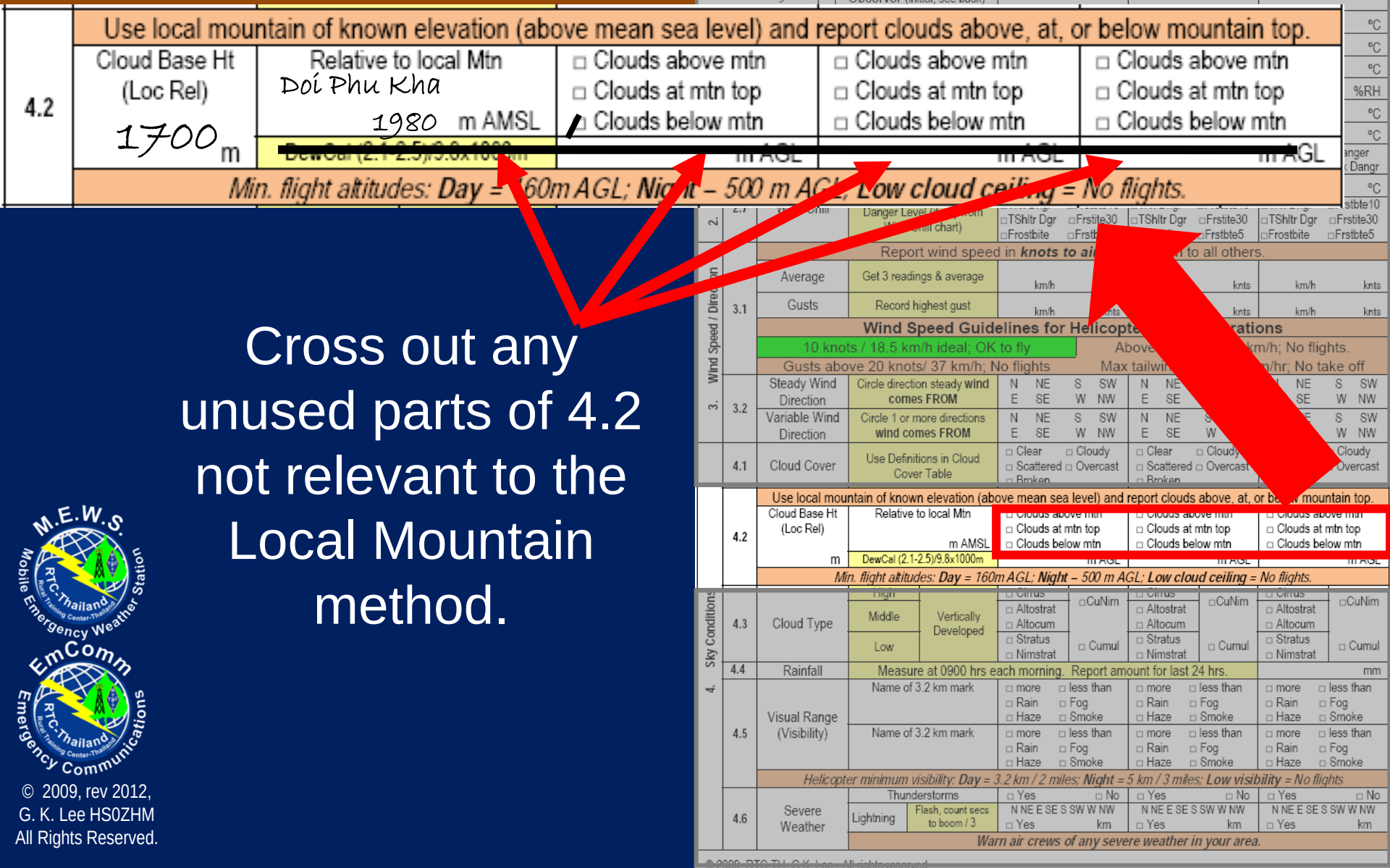
Record Your Observations



Cross out any unused parts of 4.2 not relevant to the Local Mountain method.

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Flight Advisory

Reporting Cloud Base Height relative to a local mountain may not be accurate enough to determine minimum flight altitudes for advisory notification.

4.2	Use local mountain of known elevation (above mean sea level) and report clouds above, at, or below mountain top.				
	Cloud Base Ht (Loc Rel) 1700 m	Relative to local Mtn Doi Phu Kha 1980 m AMSL	☐ Clouds above mtn ☐ Clouds at mtn top ☑ Clouds below mtn	☐ Clouds above mtn ☐ Clouds at mtn top ☐ Clouds below mtn	☐ Clouds above mtn ☐ Clouds at mtn top ☐ Clouds below mtn
		DewCal (2.1-2.5)/9.8x1000m	m AGL	m AGL	m AGL
	*Min. flight altitudes: **Day** = 160m AGL; **Night** – 500 m AGL; **Low cloud ceiling** = No flights.*				

MEWS observers should use local knowledge and judgment to provide flight crews with any information needed for safe flight operations.

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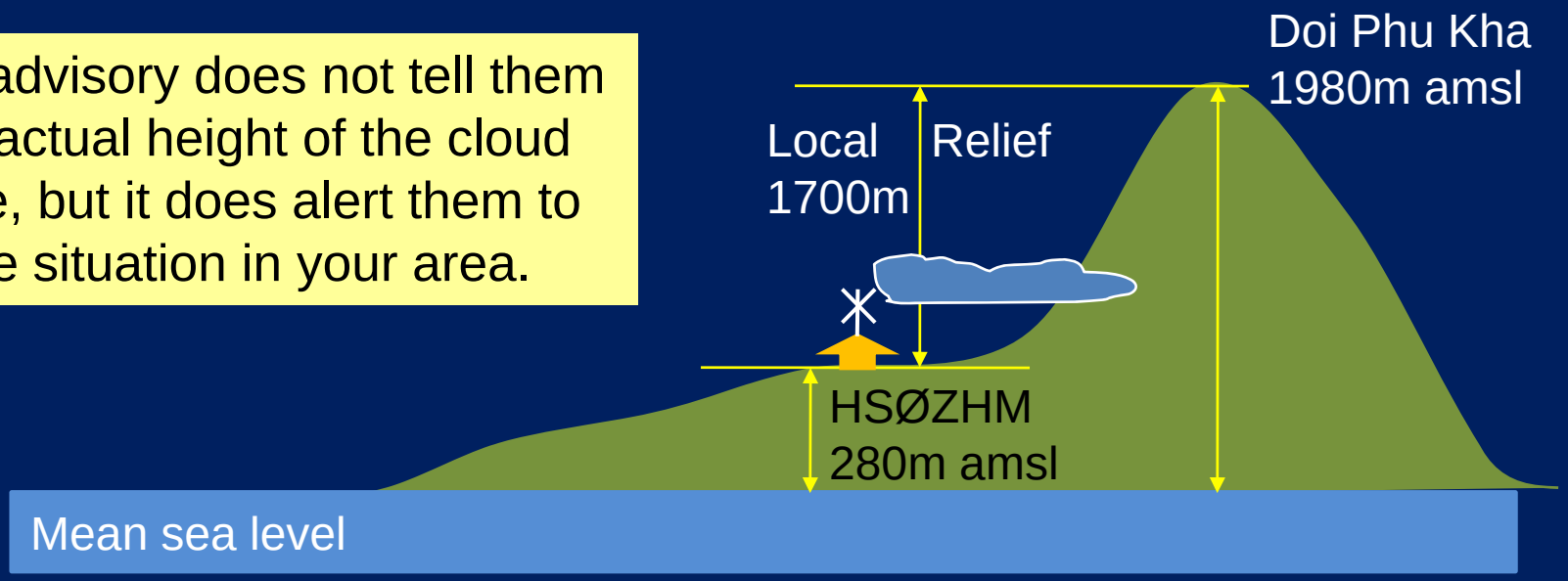
If the clouds near Doi Phu Kha were this low…

…you could report the cloud base height is "***well below*** 1700 m AGL" to warn the flight crew.

This advisory does not tell them the actual height of the cloud base, but it does alert them to the situation in your area.



The Dew Point method can give a more precise Cloud Base Height AGL . (See Advanced MEWS Lesson A3.)

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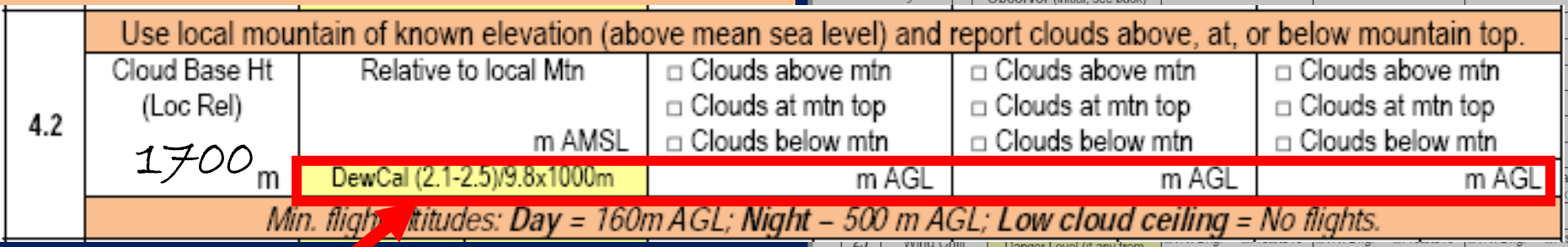
Dew Point Calculation



If reporting Cloud base height by this method, use the lower part of Line 4.2

The Dew Point Method is in Advanced MEWS Lesson A3

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Important Note

Normally MEWS observations are made 3 times a day. However, if flight operations are in progress, try to provide flight crews with weather updated prior to landings and take-offs for flight safety.

Report a Flight Advisory any time cloud base height is ***near to***, ***at***, ***or less*** than the warning limits listed on the Log Form.

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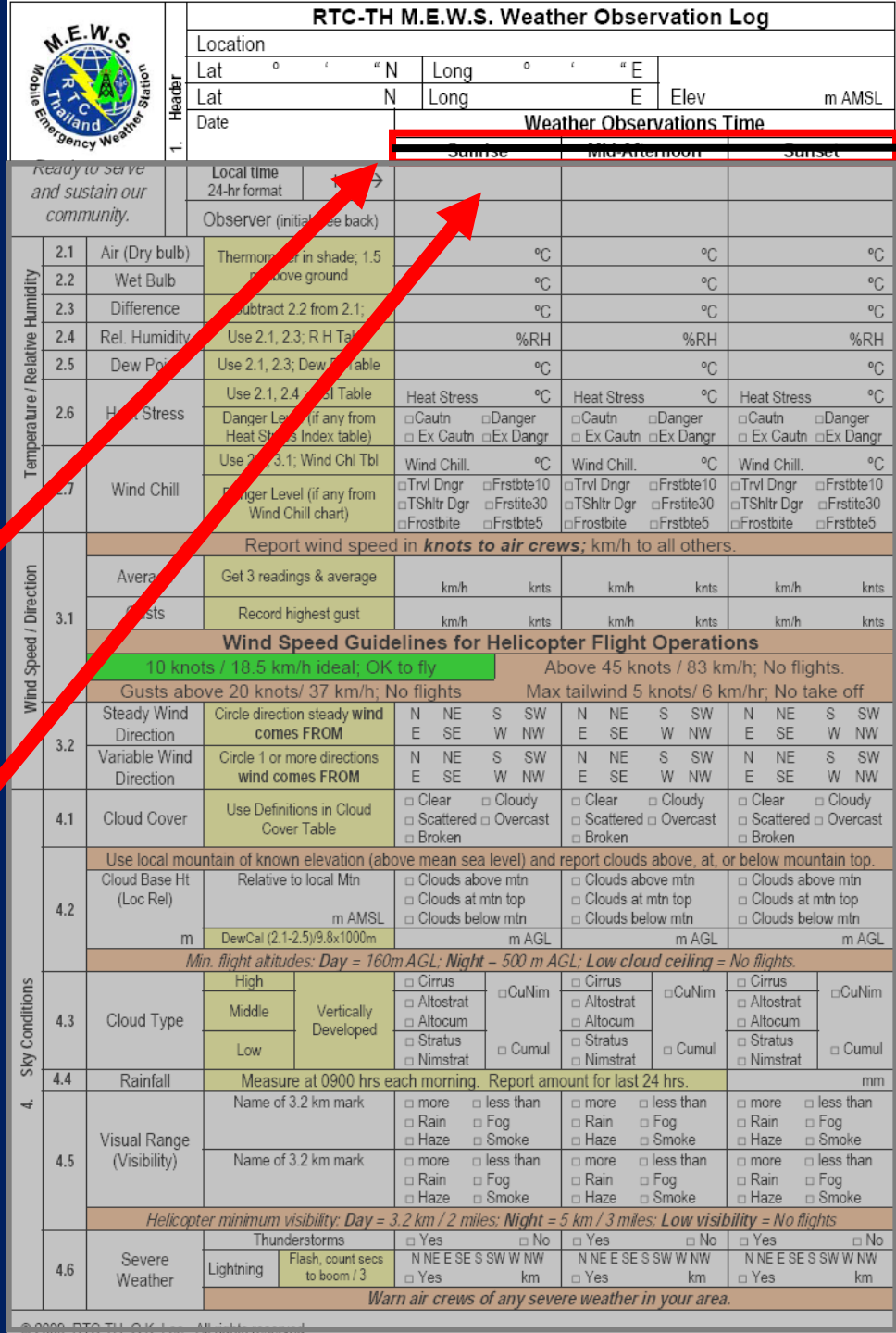
If more frequent observations are done to support flight operations...

…cross out the headings "Sunrise", etc. and record the time of the observations in the space provided.



RTC-TH M.E.W.S. Weather Observation Log

1. Header

Location

Lat ° ' " N | Long ° ' " E

Lat N | Long E | Elev m AMSL

Date

Weather Observations Time

			Sunrise	Mid-Afternoon	Sunset
		Ready to serve and sustain our community.			
		Local time 24-hr format			
		Observer (initials see back)			
Temperature / Relative Humidity	2.1	Air (Dry bulb)	Thermometer in shade; 1.5 m above ground	°C	°C	°C
	2.2	Wet Bulb		°C	°C	°C
	2.3	Difference	Subtract 2.2 from 2.1;	°C	°C	°C
	2.4	Rel. Humidity	Use 2.1, 2.3; R H Table	%RH	%RH	%RH
	2.5	Dew Point	Use 2.1, 2.3; Dew Table	°C	°C	°C
	2.6	Heat Stress	Use 2.1, 2.4; HS Table	Heat Stress °C	Heat Stress °C	Heat Stress °C
			Danger Level (if any from Heat Stress Index table)	□Cautn □Danger □ Ex Cautn □Ex Dangr	□Cautn □Danger □ Ex Cautn □Ex Dangr	□Cautn □Danger □ Ex Cautn □Ex Dangr
	2.7	Wind Chill	Use 2.1, 3.1; Wind Chl Tbl	Wind Chill. °C	Wind Chill. °C	Wind Chill. °C
			Danger Level (if any from Wind Chill chart)	□Trvl Dngr □Frstbte10 □TShltr Dgr □Frstite30 □Frostbite □Frstbte5	□Trvl Dngr □Frstbte10 □TShltr Dgr □Frstite30 □Frostbite □Frstbte5	□Trvl Dngr □Frstbte10 □TShltr Dgr □Frstite30 □Frostbite □Frstbte5
Wind Speed / Direction		Report wind speed in ***knots to air crews;*** km/h to all others.			
	3.1	Average	Get 3 readings & average	km/h knts	km/h knts	km/h knts
		Gusts	Record highest gust	km/h knts	km/h knts	km/h knts
		Wind Speed Guidelines for Helicopter Flight Operations			
		10 knots / 18.5 km/h ideal; OK to fly		Above 45 knots / 83 km/h; No flights.	
		Gusts above 20 knots/ 37 km/h; No flights		Max tailwind 5 knots/ 6 km/h; No take off	
	3.2	Steady Wind Direction	Circle direction steady **wind comes FROM**	N NE S SW E SE W NW	N NE S SW E SE W NW	N NE S SW E SE W NW
		Variable Wind Direction	Circle 1 or more directions **wind comes FROM**	N NE S SW E SE W NW	N NE S SW E SE W NW	N NE S SW E SE W NW
4. Sky Conditions	4.1	Cloud Cover	Use Definitions in Cloud Cover Table	□ Clear □ Cloudy □ Scattered □ Overcast □ Broken	□ Clear □ Cloudy □ Scattered □ Overcast □ Broken	□ Clear □ Cloudy □ Scattered □ Overcast □ Broken
		Use local mountain of known elevation (above mean sea level) and report clouds above, at, or below mountain top.			
	4.2	Cloud Base Ht (Loc Rel)	Relative to local Mtn m AMSL	□ Clouds above mtn □ Clouds at mtn top □ Clouds below mtn	□ Clouds above mtn □ Clouds at mtn top □ Clouds below mtn	□ Clouds above mtn □ Clouds at mtn top □ Clouds below mtn
		m	DewCal (2.1-2.5)/9.8x1000m	m AGL	m AGL	m AGL
		*Min. flight altitudes: **Day** = 160m AGL; **Night** – 500 m AGL; **Low cloud ceiling** = No flights.*			
	4.3	Cloud Type	High / Middle / Low — Vertically Developed	□ Cirrus □ Altostrat □ Altocum □ Stratus □ Nimstrat □CuNim □ Cumul	□ Cirrus □ Altostrat □ Altocum □ Stratus □ Nimstrat □CuNim □ Cumul	□ Cirrus □ Altostrat □ Altocum □ Stratus □ Nimstrat □CuNim □ Cumul
	4.4	Rainfall	Measure at 0900 hrs each morning. Report amount for last 24 hrs.			mm
	4.5	Visual Range (Visibility)	Name of 3.2 km mark	□ more □ less than □ Rain □ Fog □ Haze □ Smoke	□ more □ less than □ Rain □ Fog □ Haze □ Smoke	□ more □ less than □ Rain □ Fog □ Haze □ Smoke
			Name of 3.2 km mark	□ more □ less than □ Rain □ Fog □ Haze □ Smoke	□ more □ less than □ Rain □ Fog □ Haze □ Smoke	□ more □ less than □ Rain □ Fog □ Haze □ Smoke
		*Helicopter minimum visibility: **Day** = 3.2 km / 2 miles; **Night** = 5 km / 3 miles; **Low visibility** = No flights*			
	4.6	Severe Weather	Thunderstorms	□ Yes □ No	□ Yes □ No	□ Yes □ No
			Lightning — Flash, count secs to boom / 3	N NE E SE S SW W NW □ Yes km	N NE E SE S SW W NW □ Yes km	N NE E SE S SW W NW □ Yes km
		Warn air crews of any severe weather in your area.			

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For flight operations, make and report observations to flight crews before landings and take-offs

Cross out the headings for Sunrise, Mid-Afternoon, Sunset

Record the specific local time of your observations

	Weather Observations Time		
	~~Sunrise~~	~~Mid-Afternoon~~	~~Sunset~~
Hour→	1430		
al; see back)	HSØZHM		
n shade; 1.5	°C	°C	°C
ground	°C	°C	°C
from 2.1;	°C	°C	°C

If a HAM, print your call sign (or name if no call sign)

Record Cloud Base Height in Section 4.2

Weather observations to support flight operations are critical for safety of flight crew and LZ area.

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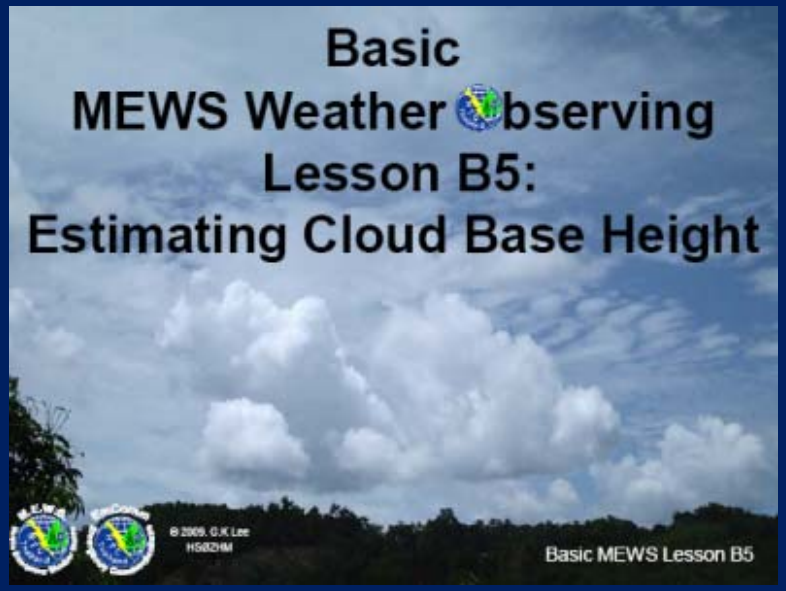
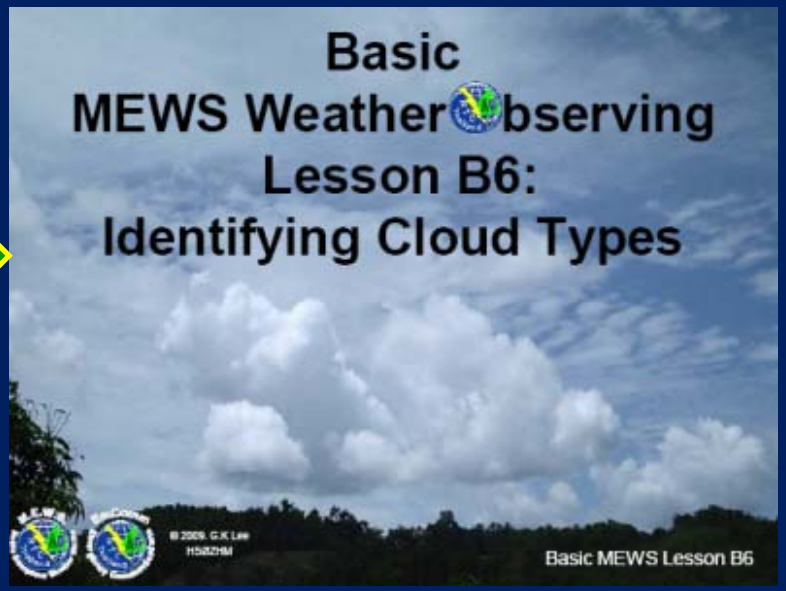
Now you know how to make a Basic Estimations of Cloud Base Height





You are now ready for Basic MEWS Lesson B6: Identifying Cloud Types

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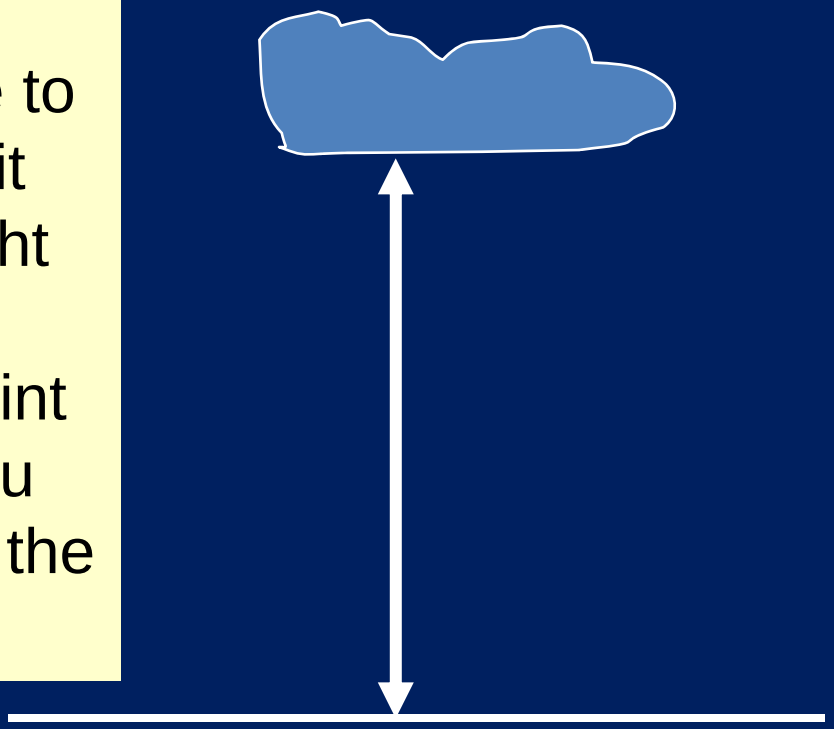
Knowing the relative humidity help you know the height of a cloud layer.

A low cloud ceiling (clouds that are close to the ground) can limit emergency relief flight operations.
Knowing the Dew Point Temperature lets you estimate the height of the cloud layer.



Calculating the Cloud Base Height by using Relative Humidity and the Dew Point Temperature is covered in Advanced Lesson A3.

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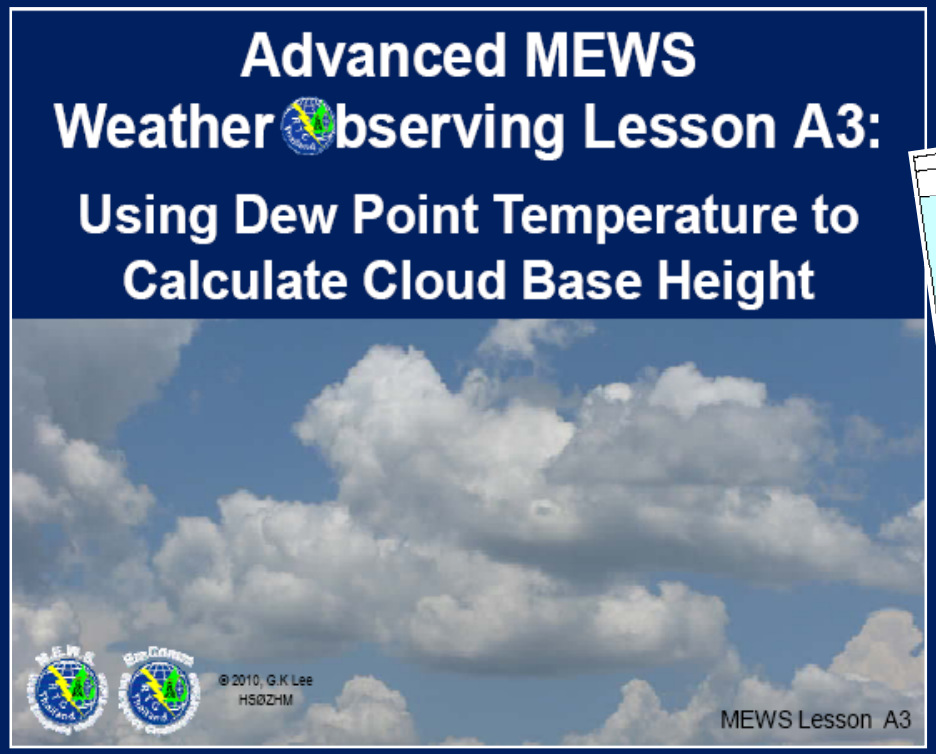
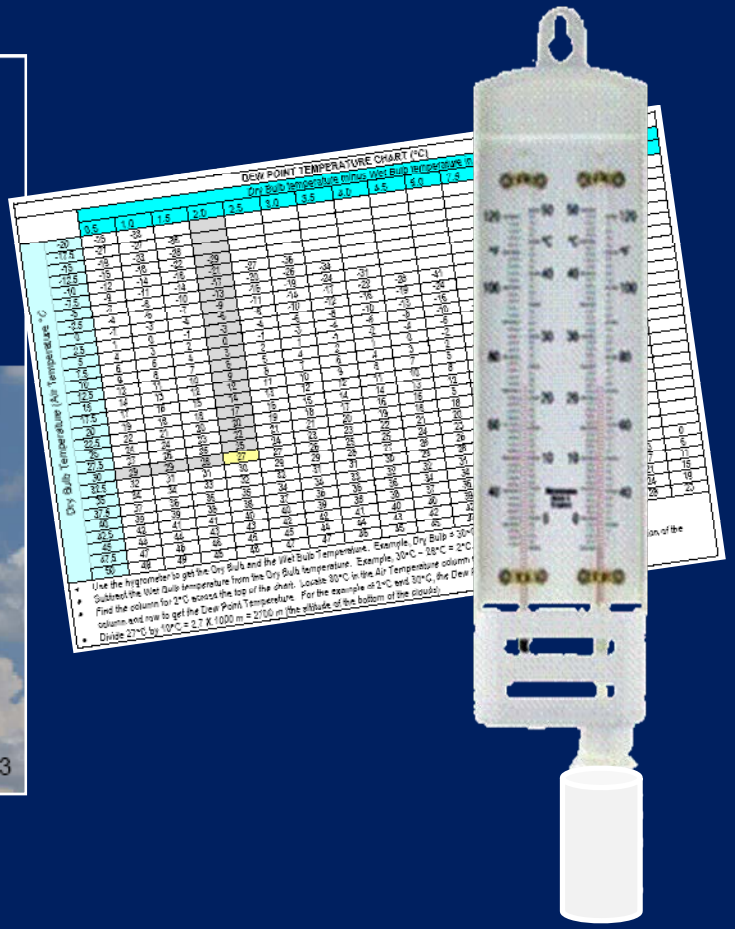
Learn more about estimating cloud base height in Advanced MEWS Lesson A3

The Dew Point method of calculating Cloud Base Height gives a more precise height measurement AGL.





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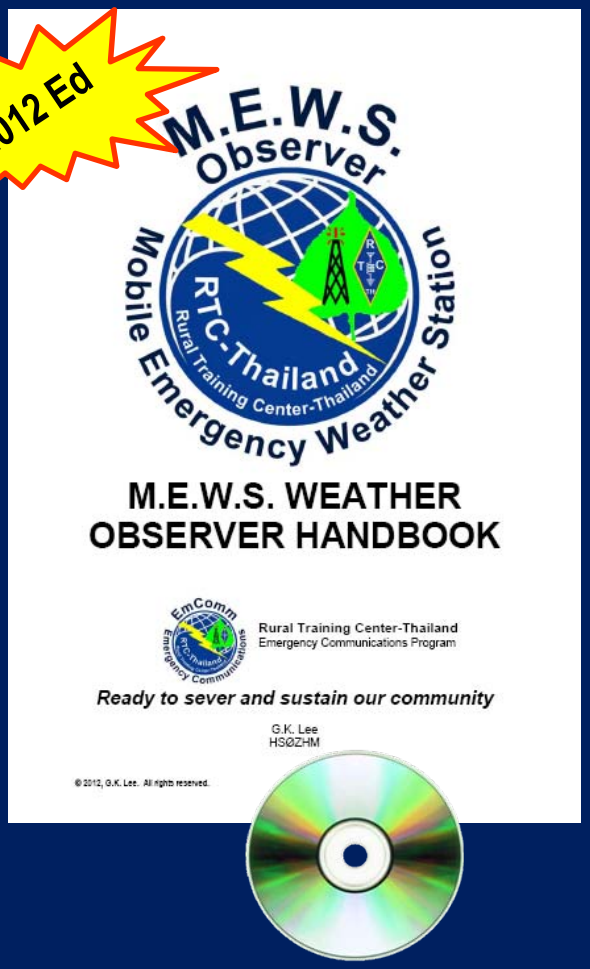
Free Self-Study Materials by Internet

- RTC-TH Weather Observer manual
- Illustrated PDF topical lessons

All of the lessons have been classroom and field proven.

Send e-mail to hsØzhm@gmail.com to request free training materials for non-commercial use only.



These materials are in English. Volunteer assistance for Thai translation to is welcome and will be acknowledged and cited.

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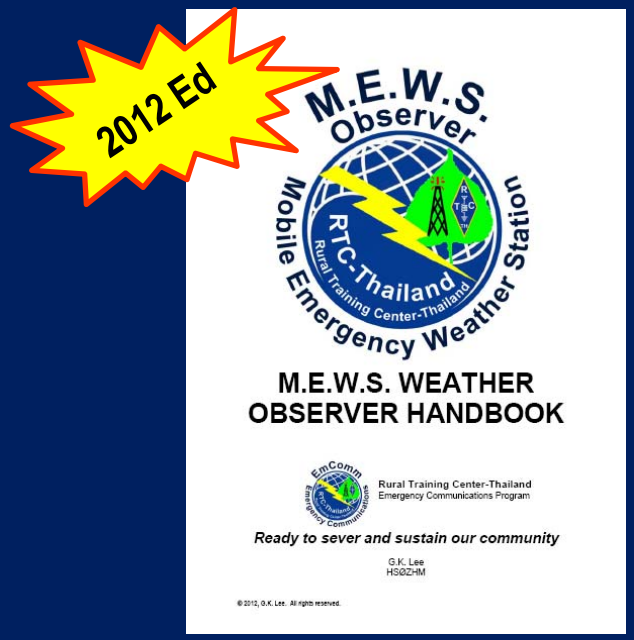
Questions or Comments

Refer to the MEWS Weather Observer Handbook for more details on any of the procedures in this lesson.



You may also contact us by e-mail:
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We are always trying to improve our lessons. Your comments and suggestions are welcomed.

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Basic MEWS PDF Lessons

B 1: Measuring Temperature
B 2: Estimating wind speed
B 3: Measuring Wind Direction
B 4: Estimating Cloud Cover
B 5: Estimating Cloud Base Height
B 6: Identifying Cloud Types
B 7: Estimating Visual Range
B 8: Severe Weather Conditions

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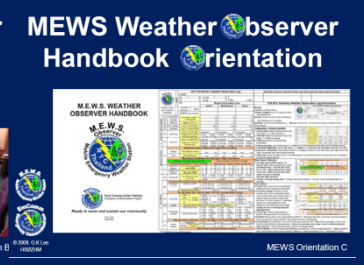
Basic MEWS PDF Lessons



2012 Ed

3 Orientation and 8 Basic lessons.
Some show how to build your own weather equipment.

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Advanced MEWS PDF Lessons

A 1: Measuring Relative Humidity and Heat Stress

A 2: Measuring Wind Speed and Wind Chill

A 3: Using Dew Point Temperature to Calculate Cloud Base Height

A 4: Measuring Rainfall

A 5: Reporting Severe Weather

A 6: Weather Forecasting

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The End

You may now go to Basic MEWS Lesson B6: Identifying Cloud Types

M.E.W.S. Mobile Emergency Weather Station

EmComm Emergency Communications

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